

1902.

LEGISLATIVE ASSEMBLY.

NEW SOUTH WALES.

ANNUAL REPORT

OF THE

DEPARTMENT OF MINES,

NEW SOUTH WALES,

FOR THE YEAR

1901.

Printed under No. 7 Report from Printing Committee, 12 August, 1902.

SYDNEY: WILLIAM APPLGATE GULLICK, GOVERNMENT PRINTER.

1902.

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Direct of 1901

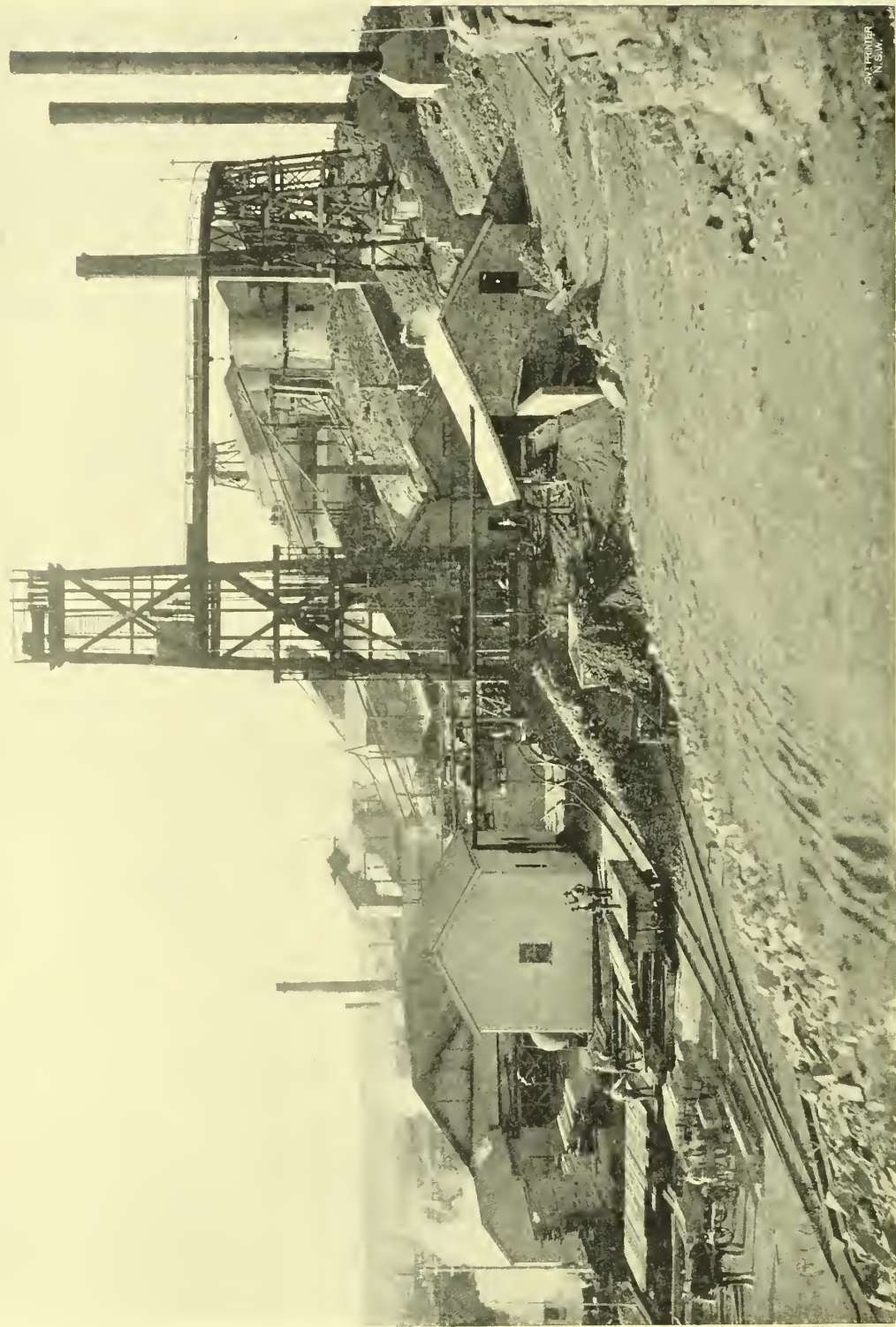
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JOHN PRITCHARD
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BLOCK 10 MINE BROKEN HILL.

ANNUAL REPORT

OF THE

DEPARTMENT OF MINES,

NEW SOUTH WALES.

To The Honorable John Kidd, Esq., M.P., Minister for Mines and Agriculture,
&c., &c.

Sir,

I do myself the honor to submit the following report upon the transactions of the Mining Division of the Department under your control, and the progress of mining during the year 1901.

It is a matter for regret that the year's operations have not been so successful as in the preceding year; but when the effect caused by the low prices ruling for several of the principal metals is taken into consideration, the yield gives proof of the stability and importance of the mineral industry of the State. While the fall in values has been the means of checking production, it has had the beneficial effect of stimulating the exercise of economies in working, and the bringing about of improvements in the methods of treatment; considerable developmental operations have been carried out, and it can be said that never previously have the mines, as a whole, been in a better position to put forth large quantities of ore. The long season of drought which characterised the year has also proved a great drawback to the industry, as without an adequate supply of water mining pursuits cannot progress. Taking into account the adverse circumstances those controlling mining operations have had to encounter, the year's record of work done must be considered as satisfactory.

MINERAL PRODUCTS.

The aggregate value of the mineral products of the State to the end of 1901 is estimated at £146,642,167 Gs. 1d.

The value of the production for the year 1901 was £6,006,635 11s. 3d., which represents a net decrease of £564,183 18s. 10d. on that of the previous year.

On reference to the following comparative table, it will be seen that the total increases amount to £617,341 3s. 2d.—coal, oil shale, opal, lime and limestone, alunite, iron, and bismuth, contributing chiefly to this result.

The total decreases, however, amount to £1,181,525 2s. The principal deficiencies occur under the headings, silver, lead, and zinc, which show a shortage of £828,429, the fall in the price of these metals being responsible for this result. The decrease in the value of the gold yield amounts to £273,239, and the reports from the various centres indicate that, owing to a variety of causes, not nearly so much attention was devoted to this branch of the industry as in preceding years. Copper shows a decrease in value of £14,734, and here again the market conditions are indubitably responsible. In tin there is a falling off to the extent of £43,617, and this is mainly attributable to the fact that, owing to the partial depletion of most of our known alluvial deposits, the production is in a great measure dependent on the exertions of fossickers, and the extended drought has prevented them from carrying on work. Coke also shows a shortage of £3,995 in value, although there is an increase in the tonnage, thus indicating that the depression in the metal market has caused the lowering of the price of this commodity.

The increase in the quantity and value of the coal production is most gratifying; the figures eclipse all previous records, and give undoubted proof of the growth and expansion of this branch of the industry. The output of noble opal was largely increased during the year, owing to the number of men who were attracted to the White Cliffs field as the result of the depression in the Broken Hill and Cobar divisions; it is satisfactory to note that good results have been obtained, and that the field has most opportunely supported a large population. The increase in the output and value of kerosene shale is due to the activity of the export trade, and in a lesser degree to the requirements of the retorts at Torbane in connection with the supply of crude oil to the Australian Gas Company.

Fuller particulars regarding each mineral will be found under the respective headings in another portion of this report.

The following table shows the aggregate value of minerals, the product of New South Wales, for the years 1900 and 1901, respectively, compared:—

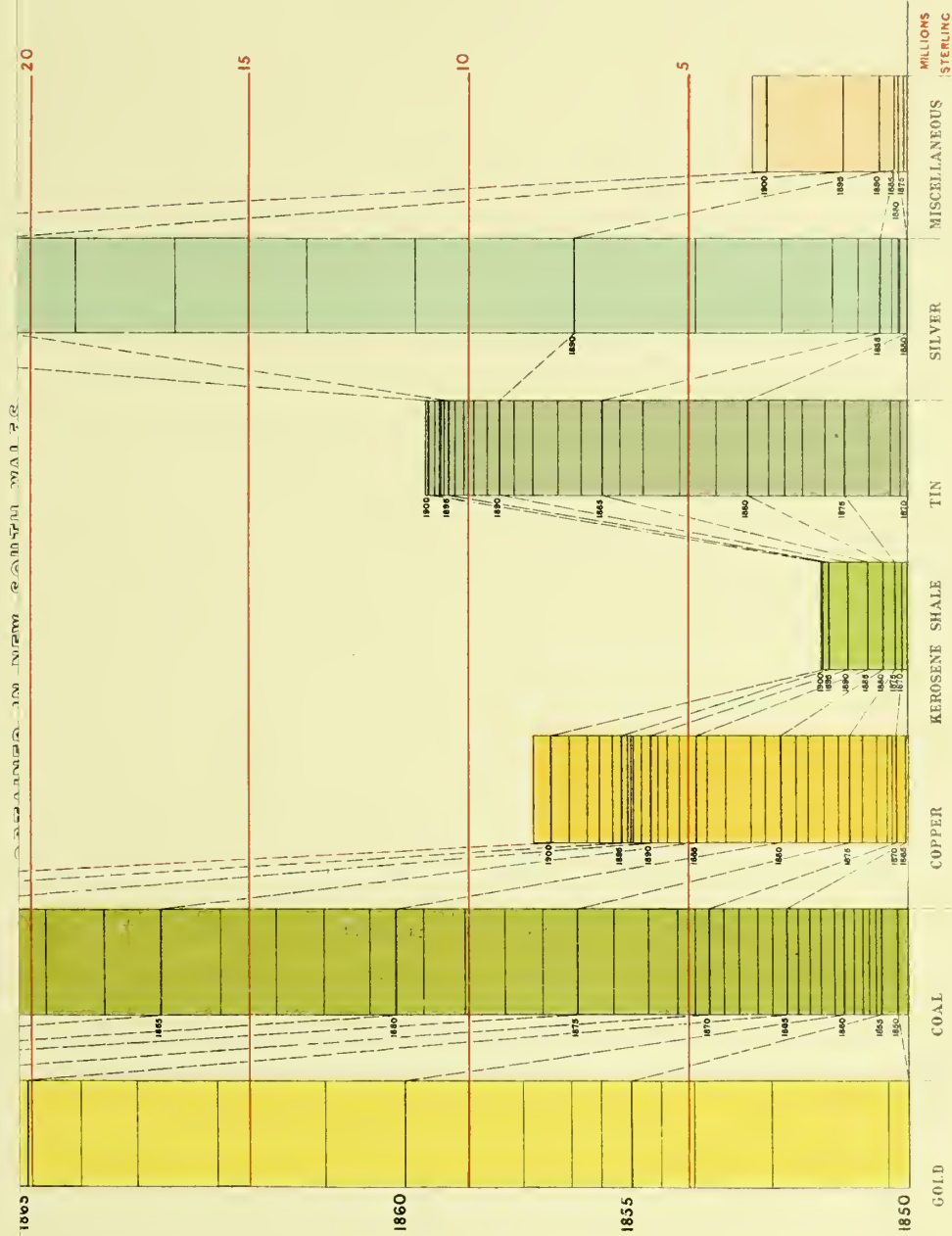
Minerals.	1900.		1901.		Increase in Value.	Decrease in Value.
	Quantity.	Value.	Quantity.	Value.		
		£ s. d.		£ s. d.	£ s. d.	£ s. d.
Alunite.....	1,915·00 tons	5,745 0 0	3,146·00 tons	9,438 0 0	3,693 0 0	.....
Antimony (metal and ore)	248·40 ,,	2,429 0 0	88·15 ,,	1,183 0 0	.....	1,246 0 0
Bismuth (metal and ore)	10·70 ,,	5,640 0 0	20·80 ,,	6,665 0 0	1,025 0 0	.....
Building Stones†	2,270 pgs.	1,054 0 0	.....	813 0 0	.....	241 0 0
Chrome.....	3,285·35 tons	11,827 0 0	2,483·40 ,,	7,774 0 0	.....	4,053 0 0
Coal	5,507,497 ,,	1,668,911 3 7	5,968,426 ,,	2,178,929 4 9	510,018 1 2	.....
Cobalt ore	143·25 ,,	1,590 0 0	110·60 ,,	1,051 0 0	.....	539 0 0
Coke	126,213·00 ,,	109,620 2 6	128,882·00 ,,	105,665 0 6	.....	3,955 2 0
Copper (ingots, matte, and ore)*	7,092·45 ,,	428,036 0 0	6,802·50 ,,	413,302 0 0	.....	14,734 0 0
Diamonds..	9,828·50 cts.	5,663 1 0	9,322·00 cts.	9,756 0 0	4,092 19 0	.....
Fireclay†	29·70 tons	109 0 0	16·70 tons	35 0 0	.....	74 0 0
Grindstones†	311 No.	77 0 0	371 No.	121 0 0	44 0 0	.....
Gold	345,650 oz.	1,194,521 0 0	267,061 oz.	921,282 0 0	.....	273,239 0 0
Iron‡	7,737·00 tons	95,000 0 0	10,424·00 tons	123,750 0 0	28,750 0 0	.....
Iron, "Oxide"†	313·50 ,,	686 0 0	128·55 ,,	229 0 0	.....	457 0 0
Ironstone Flux..	13,146·00 ,,	10,945 0 0	4,136·00 ,,	3,536 0 0	.....	7,409 0 0
Lead (pig, &c.)...	6,700·10 ,,	139,146 0 0	3,340·50 ,,	100,501 0 0	.....	38,645 0 0
Lime	9,528·00 ,,	9,198 0 0	20,855·00 ,,	16,247 0 0	7,049 0 0	.....
Limestone Flux	17,000·00 ,,	3,962 10 0	26,570·00 ,,	5,794 0 0	1,831 10 0	.....
Manganese Ore..	18·00 ,,	46 0 0	12·00 ,,	24 0 0	.....	22 0 0
Marble †	.....	563 0 0	.....	408 0 0	.....	155 0 0
Noble Opal .....	.....	80,600 0 0	.....	120,000 0 0	40,000 0 0	.....
Platinum	530 oz.	1,007 0 0	389·00 oz.	779 0 0	.....	228 0 0
Silver§ (ingots and matte) ...	774,203 ,,	90,243 0 0	448,501 ,,	50,484 0 0	.....	39,759 0 0
Silver-lead, Ore, and Sulphide.	438,837·85 tons	2,513,874 0 0	417,078·15 tons	1,803,979 0 0	.....	709,895 0 0
Shale (oil)	22,862 ,,	20,651 13 0	54,774 ,,	41,489 6 0	20,837 13 0	.....
Tin (ingots and ore)||	916·35 ,,	120,932 0 0	667·25 ,,	77,315 0 0	.....	43,617 0 0
Zinc Concentrates	20,269·05 ,,	44,187 0 0	631·99 ,,	4,057 0 0	.....	40,130 0 0
Sundry Minerals and Ore.¶	192·30 ,,	5,156 0 0	48·25 ,,	2,029 0 0	.....	3,127 0 0
	£	6,570,819 10 1	£	6,006,635 11 3	£ 617,341 3 2	£1,181,525 2 0
					Net decrease.....	£564,183 18 10

* Exclusive of a large quantity of copper (ingots and matte) produced in this State, during the year, from ore imported for treatment from other Australian States, New Zealand, and New Caledonia. † Quantity exported only. ‡ Made from scrap, &c. § The bulk of the silver produced is exported in the shape of silver-lead. || Exclusive of tin refined in this State from imported ores. ¶ Inclusive of tungsten ores to the value of £1,913 for 1900 and £163 for 1901.

DIAGRAM

SHEWING THE VALUE OF THE

MINERALS



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DIAGRAM

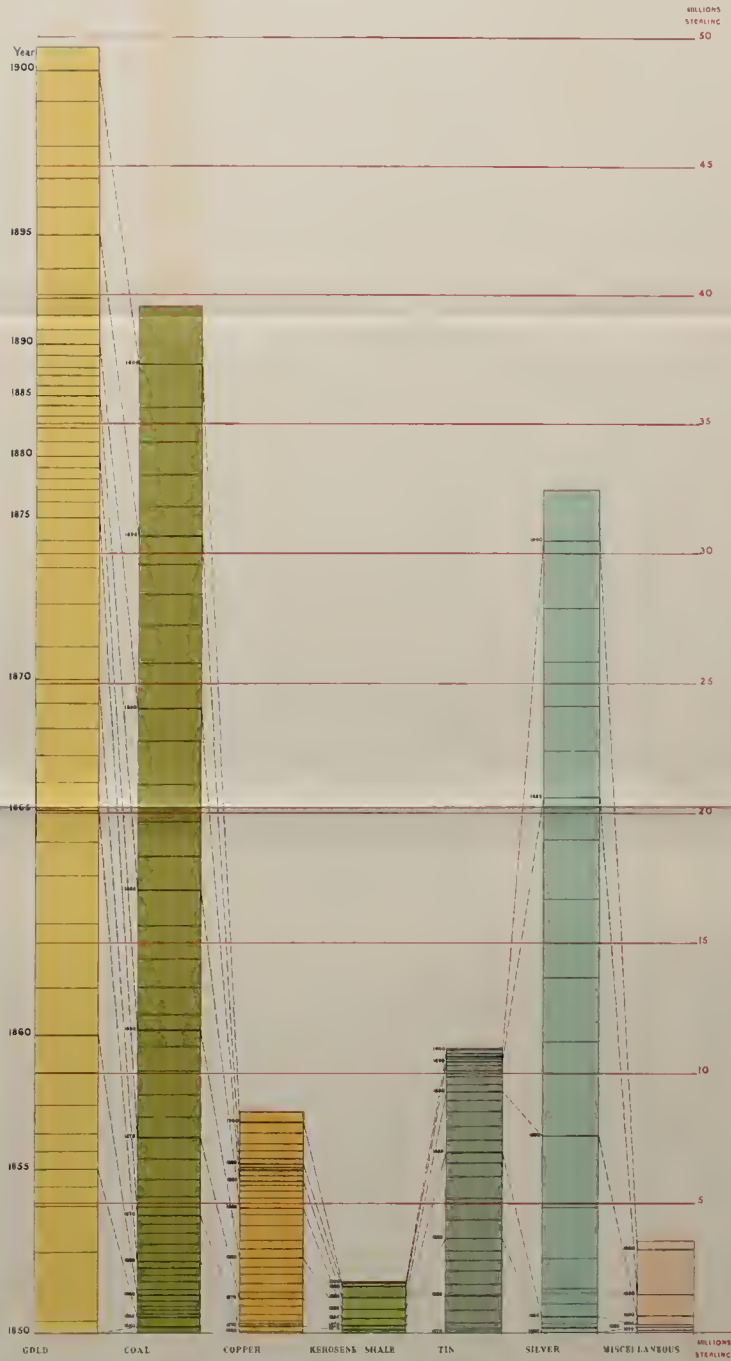
SHOWING THE VALUE OF THE

MINERALS

OBTAINED IN NEW SOUTH WALES

TO THE END OF THE YEAR

1901



DIAGRAM

Showing the Annual Value of the Mineral Products of the State of New South Wales to the end of the year 1901.

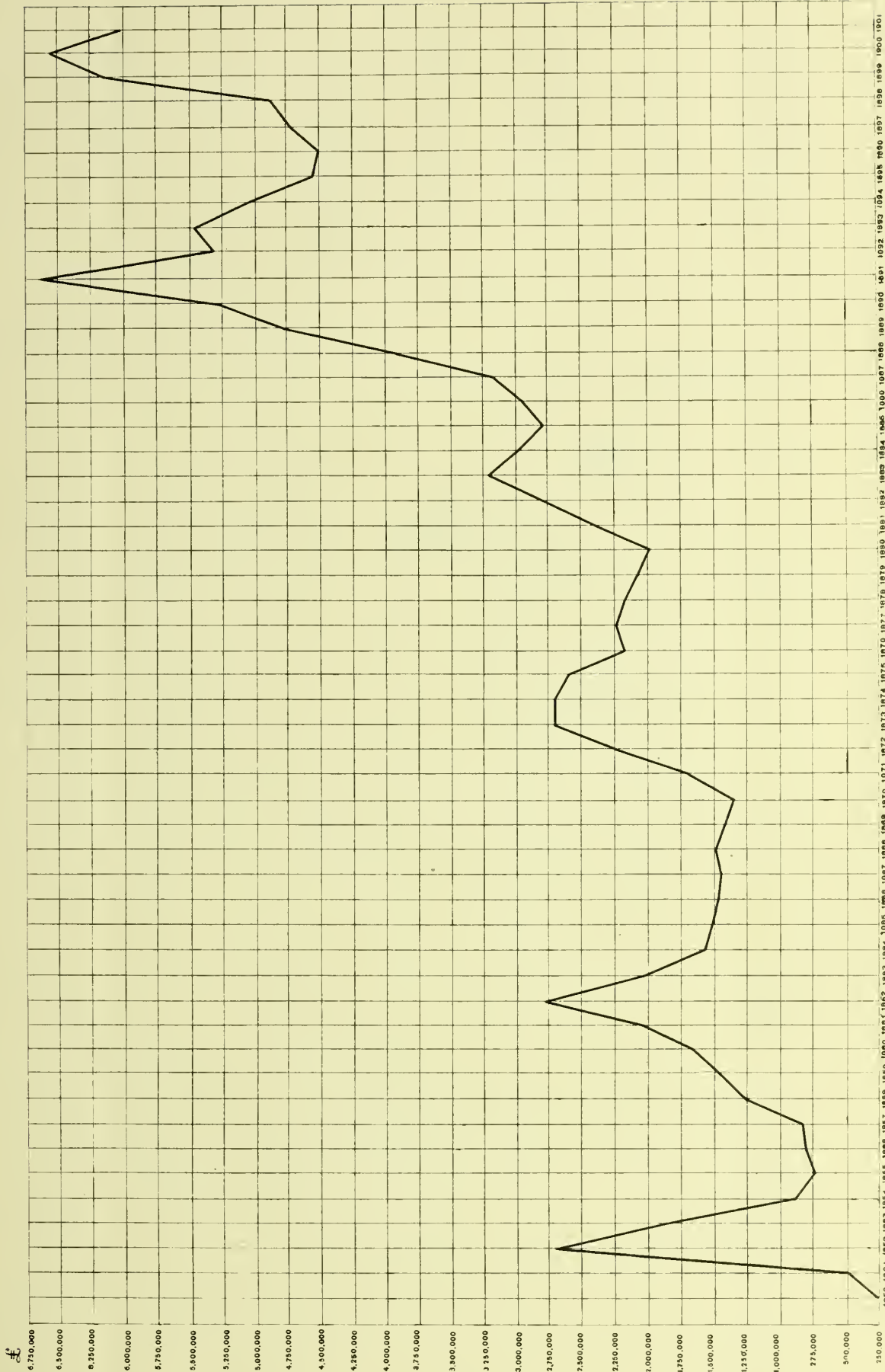


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The following table shows the annual value of the mineral products of the State of New South Wales to the end of the year 1901 :—

Year.	Value.	Year.	Value.	Year.	Value.	Year.	Value.
	£		£		£		£
Prior to 1850†	254,375	1864	1,580,458	1878	2,172,588	1891	6,656,985
1851	493,882	1865	1,524,445	1879	2,085,456	1892	5,312,405
1852	2,697,831	1866	1,469,393	1880	1,983,113	1893	5,456,169
1853	1,859,231	1867	1,441,676	1881	2,380,461	1894	5,058,863
1854	892,589	1868	1,488,587	1882	2,782,598	1895	4,553,148
1855	743,676	1869	1,415,919	1883	3,204,809	1896	4,500,994
1856	807,080	1870	1,344,954	1884	2,886,392	1897	4,708,968
1857	822,635	1871	1,708,992	1885	2,779,606	1898	4,866,998
1858	1,267,737	1872	2,235,450	1886	2,933,578	1899	6,157,558
1859	1,464,076	1873	2,702,623	1887	3,166,241	1900	6,570,820
1860	1,693,401	1874	2,703,036	1888	3,879,974	1901	6,006,636
1861	2,028,382	1875	2,593,921	1889	4,781,959	Total ... £	146,642,167
1862	2,784,076	1876	2,184,487	1890	5,284,175		
1863	2,035,580	1877	2,233,190				

† Coal only, for particulars of each year's output, see table on page 40.

The following table shows the quantity and value of the mineral products of the State of New South Wales to the end of 1901.*

Mineral.	Recorded prior to 1901.		Recorded for 1901.		Total recorded to end of 1901.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
†Alunite	12,596·50 tons	£ 43,703 0 0	3,146·00 tons	£ 9,438 0 0	15,742·50 tons	£ 53,141 0 0
†Antimony, Metal, and Ore	11,258·95 „	193,050 8 6	88·15 „	1,183 0 0	11,347·10 „	194,233 8 6
†Bismuth, Metal, and Ore	314·18 „	56,519 14 0	20·80 „	6,665 0 0	334·98 „	63,184 14 0
†Chrome	25,234·00 „	82,802 0 0	2,483·40 „	7,774 0 0	27,717·40 „	90,576 0 0
†Coal	91,476,633·00 „	37,315,915 5 7	5,968,426·00 „	2,178,929 4 9	97,445,059·00 „	39,494,844 10 4
†Cobalt	561·20 „	4,970 0 0	110·60 „	1,051 0 0	671·80 „	6,021 0 0
§Coke	544,771·55 „	480,725 14 4	128,882·00 „	105,665 0 6	673,653·55 „	586,390 14 10
†Copper Ingots	129,939·95 „	8,093,657 0 0	5,688·00 „	413,302 0 0	135,627·95 „	8,506,959 0 0
„ Ore and Regulus	12,438·88 „		1,114·50 „		13,553·38 „	
†Diamonds	100,103½ cts.	55,534 17 0	9,322·00 cts.	9,756 0 0	109,425½ cts.	65,290 17 0
†Fireclay	221·45 tons	572 0 0	16·70 tons	35 0 0	238·15 tons	607 0 0
†Gold	13,208,572 oz.	48,740,533 5 5	267,061 oz.	921,232 0 0	13,475,633 oz.	49,661,815 5 5
†Grindstones	784 No.	391 0 0	371 No.	121 0 0	1,155 No.	512 0 0
||Iron... ..	86,793·47 tons	701,643 8 5	10,424·00 tons	123,750 0 0	97,217·47 tons	825,393 8 5
†Iron, “Oxide”	5,623·65 „	11,330 0 0	123·55 „	229 0 0	5,757·20 „	11,559 0 0
†Ironstone Flux	23,667·00 „	19,362 8 0	4,136·00 „	3,536 0 0	27,803·00 „	22,898 8 0
†Lead (Pig, &c.) <i>a</i>	14,679·50 „	274,535 0 0	3,340·50 „	100,501 0 0	18,020·00 „	375,086 0 0
§Lime <i>b</i>	10,690·00 „	11,671 0 0	20,855·00 „	16,247 0 0	31,545·00 „	27,918 0 0
†Limestone Flux	727,447·30 „	555,422 19 11	26,570·00 „	5,704 0 0	754,017·30 „	561,216 19 11
†Manganese Ore	489·85 „	1,377 0 0	12·00 „	24 0 0	501·85 „	1,401 0 0
†Marble .....	.....	3,220 0 0	.....	408 0 0	.....	3,628 0 0
†Opal (Noble) .....	.....	456,599 6 6	.....	120,009 0 0	.....	576,599 6 6
†Platinum	8,295·00 oz.	12,432 0 0	389·00 oz.	779 0 0	8,684·00 oz.	13,211 0 0
†Silver Ingots	9,572,829·34 „	30,487,114 0 0	448,501·00 „	1,854,463 0 0	10,021,330·34 „	32,341,577 0 0
†Silver-Sulphide and Silver-Lead	412,045·35 tons		16,921·25 tons		428,966·60 tons	
†Silver Ore	2,608,566·57 „		400,156·90 „		3,008,723·47 „	
†Shale	1,018,694·00 „	1,929,133 18 2	54,774·00 „	41,489 6 0	1,073,468·00 „	1,970,623 4 2
†Slates	79,234 No.	890 0 0	.....	.....	79,234 No.	890 0 0
†Stones (Building) .....	.....	10,794 0 0	.....	813 0 0	.....	11,607 0 0
† „ (Ballast)	975 tons	1,155 0 0	.....	.....	975 tons	1,155 0 0
†Tin Ingots	116,568·25 „	10,849,238 9 0	656·40 tons	77,315 0 0	117,224·65 „	10,926,553 9 0
„ Ore and Regulus ..	18,510·05 „		10·85 „		18,520·90 „	
†Zinc Concentrates	133,901·50 „	157,066 0 0	631·90 „	4,057 0 0	139,533·49 „	161,123 0 0
†Sundry unclassified Minerals .....	.....	84,123 0 0	.....	2,029 0 0	.....	86,152 0 0
Totals .....	.....	£ 140,635,531 14 10	.....	£ 6,006,635 11 3	.....	£ 146,642,167 6 1

* For details of the production of each mineral see under the respective heading. † Quantity and value exported. ‡ Quantity and value won § Quantity manufactured and value. || Quantity and value of Iron made from Scrap, &c. a Includes Lead-carbonate, and Lead-chloride. See under Lead, page 49. b Includes quantity exported (only) up to end of 1899.

PERSONS ENGAGED IN MINING.

The total number of persons employed in and about the mines of this State during 1901 is estimated at 36,615, as compared with 43,745 during 1900—a decrease of 7,130.

There is an increase of 924 in the number of persons engaged in mining for coal and shale during the year, the returns showing 12,415 and 11,491 for the years 1901 and 1900 respectively.

The number employed getting coal was 12,191 and oil-shale 224.

In the metalliferous mines it is estimated that 24,200 persons were employed during the year, as compared with 32,254 during 1900, thus showing a decrease of 8,054 persons. The principal decreases are as follows—alluvial gold miners, 2,987; quartz miners, 2,916; silver miners, 1,893.

The following tables show the number of persons employed in the different districts:—

Persons employed in the Metalliferous Mines during 1901.

Mining Districts.	Gold.			Silver, Lead, and Zinc.	Copper.	Tin.		Other.	Total.
	Alluvial.		Quartz.			Europeans.	Chinese.		
	Europeans.	Chinese.							
Albert	75	3	18	5,610	330	26	.....	*927	6,989
Bathurst	936	54	1,084	20	1,030	.....	.....	57	3,181
Clarence and Richmond.....	67	2	99	6	8	.....	.....	.....	182
Cobar .....	.....	.....	644	48	1,193	.....	.....	.....	1,885
Hunter and Macleay	5	.....	99	4	.....	6	.....	29	143
Lachlan	445	.....	1,660	.....	86	8	.....	68	2,267
Mudgee	838	54	868	12	60	.....	.....	57	1,889
New England	100	12	62	56	59	384	190	18	881
Peel and Uralla	457	76	680	422	182	547	266	+ 172	2,802
Southern	773	114	671	120	2	.....	.....	118	1,798
Tambaroora and Turon	607	104	209	.....	.....	.....	.....	.....	920
Tumut and Adelong	633	54	561	.....	14	1	.....	.....	1,263
Total employed during 1901	4,936	473	6,655	6,298	2,964	972	456	1,446	24,200
Total employed during 1900... .	7,608	779	9,571	8,196	3,334	1,050	363	1,353	32,254

* Opal miners.

† Principally diamond miners.

Persons employed in and about the Coal and Shale Mines during 1901.

Districts.	Coal.	Shale.	Total.
Northern	9,157	.....	9,157
Southern and South-western	2,499	20	2,519
Western	535	204	739
Total employed during 1901	12,191	224	12,415
Total employed during 1900.....	11,333	158	11,491

MINING ACCIDENTS.

The number of fatalities in connection with mining operations in this State during the year was 55, of which 38 occurred in the metalliferous mines, and 17 in the coal and shale mines.

There is a considerable increase in the number of minor accidents recorded during the year, owing to the fact that some of the managers have felt it incumbent on them to report all cases in which the benefits of the Miners' Accident Relief Fund* have been obtained by those injured. Notwithstanding, therefore, that the accidents might only have been of a very trivial nature, they have gone to swell the returns, which at first sight would give the idea that the miners of this State are abnormally liable to accident, whereas such is not the case, but, on the contrary, the mines are as safe to work in as those of a similar kind in other parts of the world.

In collating the information for the following table the minor accidents have not been taken into consideration.

Details of the accidents and fatalities will be found in the accompanying reports of Mr. Atkinson, the Chief Inspector of Coal Mines, and Mr. Snee, the Chief Inspector of Metalliferous Mines.

* See detailed Report, page 185.

The following statement shows the number of persons killed and seriously injured during the year 1901 in the different branches of the mining industry, and also the ratio per 1,000 persons employed:—

Class of Mining.	Total number killed.	Total number seriously injured.	Number killed per 1,000 persons employed.	Number seriously injured per 1,000 persons employed.
Coal and Shale	17	117	1·369	9·424
Gold	11	12	0·912	0·995
Silver	23	55	3·652	8·733
Copper	3	7	1·012	2·362
Tin	1	0	0·700	.....
Other Minerals	0	0	.....	.....
Total.....	55	191	1·502	5·216

MINING MACHINERY AND PLANTS.

The estimated total value of the machinery erected at the mines, other than coal or shale mines, and including £273,333 the value of the dredging plants, is £2,106,776, this amount is exclusive of the value of the extensive plants of the Smelting Companies at Dapto, Cockle Creek, and Woolwich, the copper-refining plants at Lithgow and Newcastle, and the plant at the Eskbank Iron Works, the total value of which is certainly in excess of £250,000.

The proprietors of many of the collieries have some diffidence in supplying the value of the machinery at their mines, and at this period it is regretted that sufficient data could not be obtained to enable a reliable estimate of the values to be furnished.

The following table shows the value of the mining plant and machinery in and about the mines, other than coal and shale, in the respective Mining Districts, and also the dredging plants, as at the 31st December, 1901:—

Mining District.	Gold.		Silver and Lead.	Copper.	Tin.	Other.	Total.
	Dredging.	Other.					
	£	£	£	£	£	£	£
Albert		2,300	640,887	3,363	300	425	647,275
Bathurst	6,880	100,720	8,000	108,609	.....	800	225,009
Clarence and Richmond		9,110	.....	50	.....	.....	9,160
Cobar		152,535	2,500	139,510	.....	.....	294,545
Hunter and Macleay.....		6,645	.....	.....	1,200	1,700	9,545
Lachlan	11,000	139,656	.....	50	17	410	151,133
Mudgee		61,130	.....	60	.....	10,632	71,822
New England.....	11,500	14,650	5,705	.....	14,626*	100	45,981
Peel and Uralla	22,100	111,225	41,594	12,140	11,800†	17,233‡	216,092
Southern	117,663	93,254	2,300	300	.....	2,300	215,817
Tanbaroorra and Turon.....	70,890	23,745	.....	.....	.....	.....	94,635
Tumut and Adelong	33,300	91,762	.....	700	.....	.....	125,762
Totals	£ 273,333	806,732	700,986	264,782	27,343	33,600	2,106,776

* Inclusive of dredging plant, valued at £7,000.

† Inclusive of dredging plant, valued at £9,000.

‡ Diamond-saving plants chiefly.

The following summary shows the number of men employed, the value of the machinery used in mining for the various minerals, and the average value of the mineral won per person employed during 1901:—

Classification.	Number of men employed.	Estimated value of Machinery.	Net value of the Minerals won during 1901.	Average value of Mineral won per person employed during 1901.
		£	£	£ s. d.
Coal, Coke, and Shale	12,415	.....*	2,326,684	187 7 3
Gold	12,064	1,080,065	921,282	76 7 4
Silver, Lead, and Zinc	6,298	700,986	1,959,021	311 1 1
Copper	2,964	264,782	413,302	139 8 10
Tin	1,428	27,343	77,315	54 2 10
Other Minerals	1,446	33,600	309,632	214 2 7
Totals.....	36,615	£2,106,776†	£6,006,636	£164 1 0

* Not ascertainable.

† At Mines other than Coal and Shale.

SMELTING WORKS.

The smelting works at Cockle Creek and Dapto have proved of great service to the mining community, and parcels of ores have been received at these works for treatment from most of our mineral fields. The following statement shows the quantity of ore, the product of this State, which was treated and the metal obtained therefrom:—

Quantity of ore treated, the product of New South Wales	32,525 tons.
Metal produced:—	
Gold	17,488 ounces.
Silver	661,187 „
Lead	6,466 tons.
Copper	548 „

In addition to the above, large quantities of ore received from places outside this State were also treated.

AREA UNDER MINING OCCUPATION.

As it is not compulsory in some instances for the holders of areas under the Mining Board or Mineral License Regulations to register the same, it is impossible to state definitely the area actually under mining occupation in this State. The Mining Registrars have, however, furnished careful estimates of the areas held under the Mining Board Regulations and the Mineral License Regulations, and these, taken with the holdings recorded by the Department, indicate that the total area under mining occupation as at the 31st December, 1901, was approximately 213,653 acres.

The following statement shows how this area was held:—

	Nature of Holding.	Acres.
Under Lease from the Crown		113,071
„ Application for Lease of Crown Lands		16,919
„ „ „ Private Lands		1,678
„ „ „ Dredging Lands		3,127
„ Authority to Mine on Reserved Lands, &c.		49,295
„ „ Search (Mining Act, 1889)		2,911
„ „ Enter on Private Lands		4,705
„ Mining Board Regulations		11,246
„ Mineral License Regulations		5,733
„ Agreement Section 33, M. P. L. Act		3,920
„ „ „ 11, M. L. A. Act		1,048
Total		213,653

LANDS HELD UNDER LEASE FOR MINING.

The area of Crown and private lands held under lease on the 31st December, 1901, was 113,071 acres 6 perches, as compared with 108,150 acres 3 roods 4 perches for the previous year, an increase of 4,920 acres 1 rood 2 perches. This increase is mainly owing to the fact that leases representing 8,701 acres 3 roods 11 perches were issued under the “Gold and Mineral Dredging Act.” The most noticeable alterations occur under the following heads:—

	1900.	1901.	
Coal	40,222 acres.	41,020 acres.	An increase of 988 acres.
Gold	20,717 „	27,894 „	„ 7,177 „

As regards other minerals practically the same areas are held.

During the year leases were cancelled and surrendered as under:—

		a.	r.	p.
Gold	461 Leases, area	2,681	1	25
Mineral	362 „ „	15,331	2	20
Private Lands ..	51 „ „	695	3	37
Total	874 „ „	18,709	0	2

The area thrown open last year exceeded that of the previous year by over 4,000 acres; this may be regarded as an evidence that the Department, while giving every consideration to *bona-fide* holders of land, is anxious to discourage as far as possible the practice of shepherding. About 250 of the 874 leases were cancelled at the instance of persons desirous of obtaining possession of the land, the remainder were cancelled mainly owing to the fact that the rent due was not paid, and in such cases a “preliminary notice” was published in the *Government Gazette*; in cases where beforehand notices were issued most of the land has been again reapplied for,

The



THE SULPHIDE CORPORATION COMPANY'S WORKS, COCKLE CREEK.

The following Return shows the area of Land held under Lease at 31st December, 1901, and the various Minerals for which Leases have been granted :—

Minerals, &c.	Crown Lands Occupation Act, 1861.	Mining Act, 1874.	Mining Act Further Amend- ment Act, 1884.	Mining on Private Lands Act, 1894.	Gold and Mineral Dredging Act, 1899.	Total.
	a. r. p.	a. r. p.	a. r. p.	a. r. p.	a. r. p.	a. r. p.
All minerals other than gold		40 0 0				40 0 0
Alunite and alum		162 0 0				162 0 0
Antimony		206 0 0				206 0 0
Antimony, bismuth, copper, and tin		80 0 0				80 0 0
Cinnabar ..		120 0 0				120 0 0
Coal	2,324 0 0	2,009 3 26	36,686 2 10			41,020 1 36
Coal and shale		368 2 29	10,008 2 8			10,377 0 37
Copper		4,384 1 24				4,384 1 24
Copper, flux, and limestone		40 0 0				40 0 0
Copper, lead, and tin		40 0 0				40 0 0
Copper and zinc		40 0 0				40 0 0
Diamonds		1,934 2 16				1,934 2 16
Diamonds and tin		3,570 1 28				3,570 1 28
Graphite ..		80 0 0				80 0 0
Infusorial earth		10 0 0				10 0 0
Ironstone		450 0 0				450 0 0
Lead and limestone		20 0 0				20 0 0
Limestone		45 0 0				45 0 0
Limestone and marble		40 0 0				40 0 0
Marble		80 0 0				80 0 0
Opal		625 1 12				625 1 12
Scheelite		80 0 0				80 0 0
Silver		1,493 2 21		316 1 19		1,810 0 0
Silver and bismuth		63 0 0				63 0 0
Silver and copper		1,015 0 0				1,015 0 0
Silver and lead		2,207 0 17	40 0 0	215 0 30		2,462 1 7
Silver, lead, and antimony		40 0 0				40 0 0
Silver, lead, antimony, copper, and zinc		71 3 2				71 3 2
Silver, lead, antimony, copper, tin, and zinc		40 0 0				40 0 0
Silver, lead, cobalt, and copper		40 0 0				40 0 0
Silver, lead, and copper		4,327 2 14				4,327 2 14
Silver, lead, copper, and ironstone		78 1 7				78 1 7
Silver, lead, copper, and tin		558 2 33				558 2 33
Silver, lead, copper, and zinc		487 0 0				487 0 0
Silver, lead, diamonds, and tin		40 0 0				40 0 0
Silver, lead, and ironstone		147 2 2				147 2 2
Silver, lead, and limestone		521 3 8				521 3 8
Silver, lead, and tin		40 0 0				40 0 0
Silver, lead, and zinc		71 3 8				71 3 8
Silver and tin		120 0 0				120 0 0
Sulphate of alumina and potash		10 0 0				10 0 0
Sulphurous deposits		20 0 0				20 0 0
Tin		5,027 3 2		1,741 2 36	450 0 26	7,219 2 24
Tin and wolfram		13 2 10				13 2 10
Tungsten		24 3 6				24 3 6
Turquoise ..		10 0 0				10 0 0
Wolfram		20 0 0				20 0 0
Gold		6,878 2 32	62 2 32	13,050 1 1	7,903 0 26	27,894 3 11
Gold, minerals, and precious stones					197 3 8	197 3 8
Gold and silver				1,504 1 38		1,504 1 38
Gold, silver, and lead				51 3 4		51 3 4
Gold, silver, lead, tin, and antimony				44 1 8		44 1 8
Gold and tin					150 2 31	150 2 31
Land leased for purpose of water con- servation		382 0 22		206 3 10		588 3 32
Total ..	2,324 0 0	38,116 1 39	46,797 3 10	17,130 3 26	8,701 3 11	113,071 0 6

ACQUISITION OF TITLES TO MINE.

MINING ON PRIVATE LAND.

The number of applications for "Special" or "Owners" leases, lodged in terms of section 25 of the Mining on Private Lands Act of 1894, during the year ending 31st December, 1901, was 28, covering an area of 840 acres 2 roods 16 perches.

The number of general leases (other than by owners of private lands) applied for during the same period was 46, covering an area of 837 acres 29 perches.

The total number of applications lodged during the year was 74, covering an aggregate area of 1,677 acres 3 roods 5 perches.

The areas applied for were :—

To mine for gold	a. r. p.
„ silver	629 0 0
„ silver and lead	60 0 0
„ tin	56 0 0
„ tin	904 0 0
For machinery sites, &c.	28 3 5
	1,677 3 5

To

To the end of the year 133 applications were dealt with, embracing an area of 4,183 acres 2 roods 13 $\frac{1}{4}$ perches. Of this number, 71 were approved and 62 were refused for various reasons. Of the number approved, 45 were made by owners of land, aggregating an area of 1,451 acres 1 rood 5 $\frac{1}{4}$ perches, as under :—

	a.	r.	p.
To mine for gold.....	1,160	2	35 $\frac{1}{4}$
„ silver and lead	7	2	10
„ tin	260	0	0
For machinery sites, &c.	23	0	0
	1,451	1	5 $\frac{1}{4}$

The remaining applications approved, viz., 26 were for general leases, covering an area of 232 acres 1 rood 8 perches, as under :—

	a.	r.	p.
To mine for gold.....	142	1	12
„ silver and lead	81	1	0
For machinery sites, &c.	8	2	36
	232	1	8

The total area for which applications for leases were approved during the year was 1,683 acres 2 roods 13 $\frac{1}{4}$ perches.

Of the applications for leases which were refused, 32 were for owners' special leases, covering 1,374 acres, as under :—

	a.	r.	p.
To mine for gold.....	604	0	0
„ gold and silver	10	0	0
„ gold, silver, and lead	10	0	0
„ silver and lead	40	0	0
„ tin	630	0	0
„ tin and silver	80	0	0
	1,374	0	0

The balance of the applications so dealt with, viz., 30, were for general leases, as under :—

	a.	r.	p.
To mine for gold	662	0	0
„ tin	500	0	0
For machinery sites	24	0	0
	1,126	0	0

During the year 26 agreements or leases sought to be made between the owners of private lands and miners were submitted for your concurrence in terms of the 11th section of the Mining Laws Amendment Act of 1896. To several of these your concurrence could not be given, the land being alluvial and, therefore, exempt from the operation of that part of the Act. In some cases the agreements submitted were not in such form as could be concurred in; but when the documents were returned to the parties for necessary amendments the leases were apparently abandoned, or other arrangements had been made, as the documents were not re-submitted. However, in 9 of these agreements or leases your concurrence was given, and registration was afterwards effected in accordance with the Act. During the preceding year 35 agreements were sent in, but 11 were concurred in.

Besides these agreements or leases, some 23 agreements to mine have been made by owners of land and the holders of miners' rights and mineral licenses, and have been registered in terms of section 33 of the Mining on Private Lands Act of 1894. During the previous year 56 such agreements were registered.

During the year 373 authorities were granted, in terms of the Mining on Private Lands Laws, by the District Wardens, to enter and prospect on private lands, embracing an aggregate area of 3,719 acres 2 roods 19 perches, as under :—

	a.	r.	p.
337 gold	2,619	2	19
18 silver	505	2	0
2 gold and silver	24	2	0
3 silver and lead	205	0	0
1 gold, silver, and lead	33	0	0
12 tin	332	0	0
373	3,719	2	19

MINING ON CROWN LANDS.

With regard to the acquisition of Crown lands (including reserved Crown lands) for mining purposes, the number of applications made for leases during the year ending 31st December, 1901, was 744, for an aggregate area of 24,623 acres 0 roods 37 perches. Of these, 465 were for leases for gold mining, covering 2,746 acres 1 rood 15 perches, and the balance, 275, were for mineral leases for mining for various minerals, covering an area of 21,876 acres 3 rood 22 perches. The

The number of applications dealt with during the year was 847, covering an area of 19,668 acres 0 roods 14½ perches. Of these, 528 were for mining for gold, covering an area of 2,826 acres 1 rood 19 perches; and the remaining 319 applications were for mineral leases, covering an area of 16,841 acres 2 roods 35½ perches.

The following table shows the areas applied for during the year 1901, and the minerals and metals to be mined for:—

	a.	r.	p.		a.	r.	p.
Gold	2,746	1	15	Silver, lead, and copper.....	833	0	35
Antimony	60	0	0	Silver, lead, zinc, and tin	253	0	0
Bismuth.....	160	0	0	Silver, lead, copper, and zinc	160	0	0
Coal	13,452	1	1½	Silver, lead, copper, zinc, and arsenic	40	0	0
Coal and shale	188	1	33	Silver, lead, copper, and tin.....	200	0	0
Copper	2,374	1	8	Shale	204	3	0
Chrome	40	0	0	Tin	2,171	3	25
Iron	260	0	0	Tin and diamonds	301	0	0
Limestone	100	0	0	Tungsten	80	0	0
Marble	20	0	0	Plumbago	20	0	0
Silver	422	0	0	Kaolin	48	0	0
Silver and copper	220	0	0	For machinery	48	0	0
Silver and bismuth.....	80	0	0				
Silver and lead.....	248	0	0		24,831	0	37½
Silver, lead, copper, and iron	100	0	0				

The areas held under applications for leases which had not received the approval of the Governor-in-Council up to 31st December, 1901, were:—

	a.	r.	p.
Gold.....	1,377	2	6½
Minerals	15,541	2	7
Total.....	16,919	0	13½

as under:—

	a.	r.	p.		a.	r.	p.
Gold	1,377	2	6½	Silver, bismuth, cerium, uranium, and palladium	144	0	0
Copper	666	1	8	Silver	130	0	0
Copper, silver, and lead.....	637	0	0	Tin and diamonds	120	0	0
Ironstone	80	0	0	Coal	55	3	3
Limestone	60	0	0	Marble	20	0	0
Copper and ironstone	20	0	0	Antimony	20	0	0
Tin	560	0	0	Platinum, tin, and diamonds	30	0	0
Lime and ironstone.....	40	0	0	Silver and bismuth	30	0	0
Zinc and lead	40	0	0	Platinum and tin.....	60	0	0
Coal and shale	12,495	1	36	Silver, lead, and zinc	133	0	0
Silver and lead.....	60	0	0				
Bismuth.....	20	0	0		16,919	0	13½
Paint	20	0	0				
Copper and silver	60	0	0				
Platinum, bismuth, cobalt, silver, lead, and copper	40	0	0				

During the year 4 applications were made for leases for sites for dams and reservoirs in connection with mining, the area applied for being 21 acres. During the same period 5 were refused for an aggregate area of 20 acres.

GOLD AND MINERAL DREDGING ACT, 1899.

The number of applications received for leases in terms of this Act to the 31st December, 1901, was 53, covering an area of 3,283 acres 2 roods 23 perches.

MINING ON AND UNDER RESERVED LANDS, ROADS, &C., UNDER AUTHORITIES TO MINE ISSUED IN TERMS OF SECTION 28, MINING ACT, 1874.

The number of permits or authorities to mine in terms of the above section lodged during the year 1901 was 107. The number dealt with during the same period was 140, of which number 57 were granted and 83 refused.

The following table shows the area of reserved lands comprised in permits or authorities granted during the year 1901, and the minerals to be mined for:—

	a.	r.	p.		a.	r.	p.
Coal and shale	28,533	1	14	Silver	1	0	22
Shale	2,124	3	20	Tin	40	1	16½
Coal	3,998	1	34	Cinnabar	13	0	0
Gold	110	2	11	Copper	2	3	12½
Gold and silver	0	3	1½				
Bismuth and tin	2	0	0	Total ..	34,876	2	28½
Cobalt	49	1	17				

The following table shows the area of reserved lands, roads, &c., held under authorities to mine in force on 31st December, 1901, and the minerals to be mined for:—

	a.	r.	p.		a.	r.	p.
Coal and shale	27,304	3	11	Silver	1	0	22
Coal	21,230	0	23½	Cobalt, nickel, manganese, and red ochre	8	1	14
Gold	168	0	6	Tin and diamonds	3	3	32
Tin	143	2	28	Gold and silver	1	3	28½
Copper	71	0	31½	Shale	213	2	12
Cinnabar	94	2	0				
Cobalt	53	0	35	Total	49,294	2	3½

The area so held on the 31st December, 1901, exceeded that held on the 31st December, 1900, by 13,294 acres 1 rood 27 perches.

MISCELLANEOUS TITLES.

During the year 52 applications were lodged in the various Wardens' offices for authorities to dig and search for gold and other minerals on conditional leases, conditional purchases, &c., in terms of the Mining Act of 1889. Twenty-eight of these applications have been granted, and authorities issued; the balance were refused for various reasons, the principal being that the land could be operated upon under the provisions of the Mining on Private Lands Laws. The Mining on Private Lands Act of 1894 and the Amending Act (Mining Laws Amendment Act of 1896) have superseded the Mining Act of 1889 in so far as mining on private lands or conditional leases for gold, silver, lead, tin, and antimony is concerned, and it is only with regard to mineral leases other than these that the Act operates.

As has before been pointed out, the Mining on Private Lands Laws do not operate on conditional leaseholds until after the conditional leases have been brought under their operation by proclamation. During the year 12,880 acres 3 roods have been brought under the operation of these Laws; the total area of conditionally leased lands so proclaimed since the passing of the Mining Laws Amendment Act of 1896 amounts to about 168,880 acres 3 roods.

During the year 6 applications were lodged by the owners of alienated lands for permits, in terms of section 7 of the Crown Lands Act of 1884, to mine for and remove minerals from land which under the terms of alienation were reserved to the Crown. Of these, 3 applications were granted and 3 refused. Prior to the coming into operation of the Mining on Private Lands Laws, which provide for the granting of authorities to prospect, and leases to mine for gold, silver, lead, tin, and antimony, this section, 7, of the Crown Lands Act was rather extensively used; but it has now been entirely superseded by the Mining on Private Lands Laws so far as mining for gold, silver, lead, tin, and antimony is concerned. Seeing that only minerals other than those specified can now be mined for under this section, the small number of applications made can be accounted for.

During the year 8 applications were made for authorities to dig and search for gold and other minerals on lands held from the Crown as Settlement Leases under the Crown Lands Acts. Six of these applications were granted.

GOLD.

The quantity of gold won from the gold-fields of this State to the end of 1901 is 13,475,633 oz., valued at £49,661,815.

The total yield for the year 1901 was 267,061 oz., equal to 216,888 oz. fine, valued at £921,282, as compared with 345,650 oz. (281,214 oz. fine), valued at £1,194,521, for the year 1900, a decrease of 78,589 oz., and £273,239 in value.

This is the lowest yield recorded since 1894, but is in excess of any yield previous to that year back to the year 1875.

The returns also show that 5,894 less persons were employed than in the previous year, and 7,284 less than the year 1899.

These figures give unmistakeable evidence that the industry is losing the ground gained in the immediate preceding years, and go to show that ordinary gold-mining is not receiving the attention from capitalists and miners which might reasonably be expected.

With the exception of gold-dredging, the reports from the various centres, with hardly an exception, indicate that little or no headway has been made during the year.

The diversity of the mineral wealth of this State is doubtless, to some extent, responsible for the neglect of gold-mining, because the capital which has been available has been directed towards the development of other minerals. The reefs on most of the gold-fields have been worked as far as practicable
by

by the ordinary miner, and capital is an absolute necessity for their further development; if this be not forthcoming stagnation must follow. It is a matter for regret that more attention is not given to this important industry in the way of working the reefs at a greater depth, and the exploiting of the deep alluvial leads known to exist. It is not too much to say that great possibilities yet await those who are prepared to embark capital and energy in searching for the precious metal.

The exceptional opportunities which have offered in other avenues for steady and remunerative employment within the State have attracted a large number of men from the gold-fields, and as a consequence comparatively little prospecting has been done, nor can any new finds of importance be chronicled.

Many of the old alluvial diggers have their necessities provided for through the receipt of State pensions, and consequently have relinquished their avocation, or only followed it in a desultory way; to this can be ascribed some of the falling off in the yield. A large number too of the alluvial deposits have been worked over several times, and the only way now left to secure profitable returns is by sluicing, but as it is beyond the means of the miners engaged on this work to erect the necessary dams, &c., for the conservation of water, they have perforce to depend on a good rainfall; the exceptionally dry seasons have, however, prevented much work being done, and this has helped in no small degree to bring about the lesser output for the year.

The decreased extraction of the gold contents by the cyanidation of the tailings which had accumulated for so many years on many of our fields is yet another contributing factor to the decrease in the production.

The following Table shows the Quantity and Value of Gold won in this State from 1851 to 1901 :—

Year.	Crude oz.	Value.	Year.	Crude oz.	Value.
		£ s. d.			£ s. d.
1851 ...	144,120	468,336 0 0	1878 ...	119,710	430,200 5 4
1852 ...	818,751	2,660,946 0 0	1879 ...	109,649	407,218 13 5
1853 ...	548,052	1,781,172 0 0	1880 ...	119,322	444,252 10 7
1854 ...	237,910	773,209 0 0	1881 ...	151,512	573,581 11 3
1855 ...	171,367	654,594 0 0	1882 ...	140,469	526,521 12 5
1856 ...	184,600	689,174 0 0	1883 ...	123,811	458,530 4 3
1857 ...	175,949	674,477 0 0	1884 ...	107,403	396,059 2 8
1858 ...	286,798	1,104,174 12 2	1885 ...	103,736	378,665 0 3
1859 ...	329,363	1,259,127 7 10	1886 ...	101,416	366,294 7 7
1860 ...	384,053	1,465,372 19 9	1887 ...	110,288	394,578 16 3
1861 ...	465,685	1,806,171 10 8	1888 ...	87,541	317,240 15 9
1862 ...	640,622	2,467,779 16 1	1889 ...	119,949	434,784 6 1
1863 ...	466,111	1,796,170 4 0	1890 ...	127,760	460,284 16 2
1864 ...	340,267	1,304,926 7 11	1891 ...	153,583	559,231 2 3
1865 ...	320,316	1,231,242 17 7	1892 ...	158,502	575,298 16 1
1866 ...	290,014	1,116,403 14 5	1893 ...	179,288	651,285 15 8
1867 ...	271,886	1,053,578 2 11	1894 ...	324,787	1,156,717 7 7
1868 ...	255,662	994,665 0 5	1895 ...	360,165	1,315,929 5 4
1869 ...	251,491	974,148 13 4	1896 ...	296,072	1,073,360 4 7
1870 ...	240,858	931,016 8 6	1897 ...	302,817	1,128,163 15 0
1871 ...	323,609	1,250,484 15 11	1898 ...	340,493	1,244,329 15 1
1872 ...	425,288	1,644,176 19 5	1899 ...	496,196	1,751,815 0 0
1873 ...	362,104	1,396,374 11 4	1900 ...	345,650	1,194,521 0 0
1874 ...	271,166	1,041,614 5 9	1901 ...	287,661	921,282 0 0
1875 ...	230,882	877,693 18 0			
1876 ...	167,411	613,190 7 9	Total ...	13,475,633	49,661,815 5 5
1877 ...	124,118	471,448 8 1			

The following statement gives the yield for each month of the year 1901 :—

	Uncoined Gold the product of New South Wales exported through the Customs.*	Gold received at Royal Mint, Sydney.	Total yield.		Value of yield.
	crude oz.	crude oz.	crude oz.	fine oz.	£
January	3,632	19,237	22,869	17,655	74,995
February	3,233	16,147	19,380	16,343	69,422
March	4,656	10,168	14,824	12,401	52,674
April	2,351	24,666	27,017	21,154	89,856
May	9,607	7,425	17,032	14,051	59,683
June	5,538	19,009	24,547	20,710	87,970
July	5,892	27,126	33,018	27,321	116,051
August	6,041	7,803	13,844	11,465	48,702
September	5,247	24,829	30,076	23,995	101,924
October	5,260	10,520	15,780	12,892	54,763
November	5,414	28,879	34,293	26,729	113,538
December	9,565	4,816	14,381	12,172	51,704
	66,436	200,625	267,061	216,888	921,282

* Exclusive of the quantity exported by the Mint.

The Department is indebted to the Deputy Master of the Sydney Branch of the Royal Mint for the information contained in the following table :—

Quantities of Gold received into the Royal Mint, Sydney, for coinage from the Mining Districts of New South Wales during 1900 and 1901 compared.

District.	1900.	1901.	Increase.	Decrease.
	oz.	oz.	oz.	oz.
Albert.....	403·97	456·59	52·62	.....
Bathurst	27,809·13	22,485·25	.....	5,323·88
Clarence and Richmond.....	2,958·99	1,410·49	.....	1,548·50
Cobar	37,780·83	34,853·61	.....	2,927·22
Hunter and Macleay ..	961·16	1,166·74	205·58	.....
Lachlan	65,276·32	39,210·83	.....	26,065·49
Mudgee	27,200·94	22,010·63	.....	5,190·31
New England	2,934·21	2,354·75	.....	579·46
Peel and Uralla	25,216·90	19,114·89	.....	6,102·01
Southern	20,521·95	30,352·51	9,830·56	.....
Tambaroora and Turon	7,147·56	4,211·17	.....	2,936·39
Tumut and Adelong	20,078·44	20,876·79	798·35	.....
Localities unknown.....	959·01	2,121·62	1,162·61	.....
Totals.....	239,249·41	200,625·87	12,049·72	50,673·26
		Net decrease		38,623·54

As has been mentioned in previous reports, it is impracticable to furnish statements showing the average yields from all the alluvial and quartz mines of this State, as the mine and battery owners cannot, in the majority of instances, be induced to give particulars of the quantity of material or stone treated and the yield therefrom. The data at the disposal of the Department are consequently far from complete, and the following tablos are therefore presented with the usual diffidence :—

Comparative Statement of Average Yields from Alluvial Mines* for the Years 1900–1901.

District.	1900.			1901.		
	Quantity.	Yield of Gold.	Average per Load.	Quantity.	Yield of Gold.	Average per Load.
	loads.	oz.	oz. dwt. gr.	loads.	oz.	oz. dwt. gr.
Albert.....	33,640	901	0 0 12	13,825	538	0 0 20
Bathurst	58,675	5,144	0 1 18	9,321	308	0 0 16
Clarence and Richmond	2,160	382	0 3 12	3,320	361	0 2 4
Cobar .....	.....	.....	.....	.....	.....	.....
Hunter and Macleay .....	.....	.....	.....	.....	.....	.....
Lachlan	23,322	2,351	0 2 20	7,274	1,605	0 4 10
Mudgee	17,550	960	0 1 2	12,830	2,322	0 3 15
New England .....	.....	.....	.....	.....	.....	.....
Peel and Uralla	1,617	98	0 1 5	1,900	257	0 2 17
Southern	27,050	1,514	0 1 2	2,410	299	0 2 12
Tambaroora and Turon.....	2,130	72	0 0 16	1,200	62	0 1 1
Tumut and Adelong	368,648	3,136	0 0 4	542,690	3,808	0 0 3
	534,792	15,553	0 0 13	594,770	9,605	0 0 8

* Exclusive of bucket or pump dredging.

NOTE.—The above Table only shows the yield where the quantity of stuff treated is ascertainable.

Comparative Statement of Average Yields from Quartz-mines for the Years 1900–1901.

District.	1900.			1901.		
	Quantity.	Yield of Gold.	Average per Ton.	Quantity.	Yield of Gold.	Average per Ton.
	tons.	oz.	oz. dwt. gr.	tons.	oz.	oz. dwt. gr.
Albert.....	120	100	0 16 16	.....	.....	.....
Bathurst	50,347	17,571	0 6 23	18,036	11,477	0 12 17
Clarence and Richmond	1,588	1,170	0 14 17	936	667	0 14 6
Cobar	104,552	45,653	0 8 17	89,906	27,107	0 6 1
Hunter and Macleay	868	530	0 12 5	623	341	0 10 23
Lachlan	83,004	63,491	0 15 7	54,610	42,561	0 15 14
Mudgee	64,201	23,649	0 7 8	54,539	13,468	0 4 23
New England	894	1,214	1 8 2	535	734	1 7 11
Peel and Uralla	30,534	19,739	0 12 22	20,392	15,397	0 15 2
Southern	27,626	11,291	0 8 4	34,300	11,219	0 6 13
Tambaroora and Turon.....	3,506	2,019	0 11 12	2,434	1,571	0 12 22
Tumut and Adelong	24,874	11,985	0 9 15	22,611	10,615	0 9 9
	392,084	198,412	0 10 2	298,922	135,157	0 9 1

NOTE.—The above Table only shows the yield of gold where the quantity of stone treated is available.

The following collection of notes in connection with our various gold-fields, as well as those to be found elsewhere in regard to our other metalliferous centres, are gathered from reports furnished by the Wardens and Mining Registrars. As has been pointed out on previous occasions, considerable difficulty is experienced in many instances by these officers in procuring information as fully as, in the general interest of our mining industries, could be desired. Having regard, however, to all the circumstances, and taking into consideration the numerous and varied duties many of these gentlemen are called upon to perform, the data supplied by them are fairly complete. The notes respecting dredging operations are placed under that heading, and consequently no detailed reference is made thereto in the subjoined particulars:—

BATHURST MINING DISTRICT.

Bathurst Division.

Much attention has been devoted during the year to prospecting and opening out the reefs on the Kiloola Estate, Clear Creek.

This field was visited in the month of December by the Government Geologist, and his detailed report on the various claims will be found in the Appendix to this volume. Mr. Pittman points out that at present prospecting operations are in the initiatory stage, and that only on two or three claims has exploratory work been carried far enough to warrant the opinion that the deposits are likely to be permanently payable. At Sinclairs and Mount Conqueror the crushings have proved that fairly wide deposits of good ore occur, and in several other instances the prospects are certainly promising.

Sinclair and party crushed 760 tons during the year for 767 oz., valued at £2,753, and have obtained gold to the value of over £4,000 from their claim. From the Mount Conqueror Mine, 66½ tons were crushed for a yield of 103½ oz., which averages 1 oz. 11 dwt. 2 grs. to the ton.

Some six or seven miners are also engaged seeking for alluvial on the Kiloola Estate, but with indifferent results. The estimated total yield of alluvial from all parts of the district is 67 oz.

Blackman and party have erected a cyanide plant at Napoleon Reef, Glanmire, with the object of treating the tailings, of which there are some 3,000 tons available.

The total yield of gold from this Division for the year is estimated at 1,243 ounces, valued at £4,560.

O'Connell Division.

A little fossicking for alluvial gold was done in this Division during the year, and the total quantity of gold obtained from this source is estimated at 120 oz., valued at £480.

Wattle Flat Division.

In quartz mining the year has been a very quiet one, only a few of the larger mines being in operation.

The Big Oakley Consolidated Mine has been worked by a party of tributers, who have made good wages.

At the Roxburgh Mine work has been continued throughout the year with a fair amount of success, the want of efficient machinery having retarded operations to a considerable degree. 901 tons of stone were raised for a yield of 590 oz. 15 dwt. of gold, valued at £2,156 3s.

At Whalan's Hill, Messrs. Atherton and Sons, with assistance from the Prospecting Vote, have cut a very fair *chute* of stone, 120 tons yielding 106 oz. of gold, valued at £397 10s. As the reef is from 1 to 3 feet wide, the prospects are encouraging.

Messrs. Crawford Bros. had their 10-head battery at work crushing quartz and formation from their mine—the Caledonian, at Surface Hill. The stone, of which there are thousands of tons at grass, was raised twenty or more years ago and discarded as valueless. So far, about 350 tons have been crushed for a yield of 75 oz., which paid well.

At Bullock Flat, the find made by W. Johnston proved to be a branch of the old deep lead. Only two claims bottomed on payable gold. On Johnson and Griffiths claim, the sinking is 22 feet, and the wash from 10 to 18 inches thick. 86½ oz. of gold, valued at £332, were obtained.

Sunny Corner Division.

The total quantity of gold won in this Division during the year 1901 is estimated at 2,629 oz.; this includes 190 oz. won at the Sunny Corner Silver-mine.

With the exception of the Paddy Lackey Mine, at Dark Corner, most of the gold-mining carried on in the Division was confined to prospecting, and the results obtained have been very encouraging.

At the Paddy Lackey Mine sixteen men are permanently employed. The mine has given highly satisfactory returns during the past year, while the present prospects are very good; 1,565 oz. of gold, valued at £5,489, were obtained from some 2,000 tons of stone.

Cook Bros. and Murray, at Big Hill, near Mitchell's Creek, have done a considerable amount of work with payable results, and the prospects of this mine are most promising.

Murray and party, at Frenchy's Reef, Little Hill, have also carried out a lot of work during the year, principally prospecting, and have crushed 365 tons of quartz for a yield of 237 oz. 4 dwt. of gold, which is payable; but further prospecting is required to properly develop the mine.

At the other claims there is not anything of importance to report, as nothing payable has been disclosed.

In alluvial mining the work is confined to fossicking, mostly by old men, and the results obtained during the year have been very poor. The alluvial ground has been worked over several times, and can now only be profitably treated by sluicing; but very little water has been available during the past year for this purpose.

Orange Division.

Owing to the fact that work at most of the principal mines has been suspended during the past year from various causes, a considerable falling off in the yield of gold and number of men employed, as compared with previous years, have followed.

The contemplated amalgamation of the principal mines at Lucknow has not yet been completed, so that they have been worked with reduced labour.

No work has been done by the Wentworth Gold-fields Proprietary Company, Limited, during the year.

The Aladdin's Lamp Gold-mining Company, Limited, shut down the mine and suspended operations at the close of the year. This mine has been coupled with the adjoining but separate property, the Wentworth Proprietary Mine, which has had terms of suspension under the same management. The Aladdin Company has never previously ceased working and employing the full labour conditions from the time it started, about eight years ago, until this occasion.

Work by the Wentworth Extension Company, Limited, during the year consisted of development only, no stone being raised or milled. The same may be said of the D'Arcy Wentworth Gold-mine.

The Homeward Bound Gold-mine has been taken over by a London company, but was not worked during the last twelve months.

The Wolaroi Estate Company, between Lucknow and Orange, has been doing a considerable amount of prospecting work, and anticipates striking gold in payable quantities at an early date. The formation is said to be similar to that at Lucknow.

The work done by the Mount Shorter Gold-mining Syndicate at Rosedale for the past year shows that the mine contains a large number of small veins, some of which gave as high as 8 oz. of gold to the ton, the ore being treated at Cockle Creek. At a depth of 75 feet water was struck, which prevented further sinking, and pumping machinery

machinery will be required to keep the water down. From present indications, the lodes will doubtless turn into copper at a depth, as at the bottom of the 75-foot shaft the ore assayed 25 dwt. gold per ton, and $1\frac{1}{2}$ per cent. copper. The lode is 2 feet wide at this depth, and capital is required to develop this promising mine properly.

The Rosedale Mining Company confined operations during the year to development work only. The lode was opened out by costeaning, and prospecting shafts have been sunk on the same at intervals of 200 to 350 yards, two of which are nearly 200 feet deep; an adit level has also been driven on the lode for about 1,100 feet, intercepting the prospecting shafts, for ventilation. It is stated that so far the adit shows that the payable ore occurs in *chutes* of considerable extent. It is the intention of the owners to erect a 20-head stamp mill as soon as possible, and at the same time develop the property as far as practicable by means of the adit, which opens up over 100 feet of "backs."

The Carbine Paddock Gold-mining Company, at Forest Reefs, raised 375 tons of stone for a yield of 91 oz., valued at £273.

The Duke Gold-mining Company, No-Liability (late New Victory), at Forest Reefs, let its mine on tribute, 121 loads returning 46 oz., valued at £163. Prior to placing the mine on tribute, the Company sank a new shaft 115 feet deep, with two compartments, and drove from same for 180 feet; a winding engine was also placed on this shaft.

Kelly and M'Namara, at Carbine Paddock, Forest Reefs, have been raising washdirt, and, as far as can be ascertained, the mine is a good one, and the results obtained have been satisfactory.

The Ballarat of New South Wales Gold-mining Company, No-Liability, also at Forest Reefs, is endeavouring to procure fresh capital to recommence work in a systematic manner. The prospects, as indicated by bores, are extremely good.

The Austral Gold-mine, at Forest Reefs, was worked by a tribute party during the past twelve months. The sulphide lode is a large and promising one, and carries gold, copper, and silver.

Tom and party, at Flyer's Creek, have erected a water-wheel and crushing plant at a cost of £500, and have quantity of low-grade stone at grass.

The Coolgardie Gold Syndicate, Limited, of Four-mile Creek, Cadia, has provided a good water supply, a very substantial dam having been built. The battery has been running since March, 1901. A considerable amount of driving and stoping has been done in the mine. Negotiations are on foot to establish a good winding and pumping plant, as the main shaft is unworkable, owing to the large influx of water at the 200-foot level, and machinery is necessary to cope with it.

No work was done by the Gold and Copper Fields Syndicate, Limited, on its gold leases at Witney Green, Byng, during the past year.

A new find of gold has recently been reported about 2 miles from Witney Green, but no details are available.

At present there is comparatively no work going on at Ophir, only a few men being employed fossicking in the various creeks and gullies.

A lot of work has been done on private property by holders of permits or authorities to enter under the Mining on Private Lands Acts in various parts of this Division, and no doubt there will be a considerable development when the miners and owners of private property become more united, and they begin to understand the Act and its advantages. The miners have also been greatly assisted by grants from the Prospecting Vote.

The total yield from this Division during the year is estimated as 4,429 oz., valued at £15,982.

Molong Division.

Mining is practically at a standstill in this district. One or two parties have done a little work with assistance given by the Prospecting Board, but so far as could be learned no gold has been won during the year.

Mr. Black, of Molong, crushed 8 tons of quartz brought from other places for a yield of 4 oz. gold, value £14.

Trunkey Division.

The rainfall amounted to 28 inches for the year, which was about 25 per cent. below the average, and consequently alluvial mining suffered considerably. 517oz. of alluvial gold can be traced as having been sold in the district, but this does not represent the total production, as the miners do not all dispose of their gold here. A great many of the miners of this district have gone to Burruga, Lithgow, Cobar, and other large mining centres to work for wages, leaving only the elderly men on the field; and as a number of these are in receipt of old-age pensions they only fossick for gold as a pastime.

In quartz mining very little has been done. There are only two prospecting quartz claims working, and from these 87 tons of stone were raised, yielding 50 oz. of gold, valued at £190. These claims are owned by farmers and worked during the winter months.

No. 7 (an old holding of years gone by) has been taken up by Mr. Prosper, who intends giving it another trial in the near future.

At Kempfield, on private property, several men have been making a living during the whole of the year, in shallow alluvial workings. The place is very patchy. Some days they earn as much as £1 per man, and on other occasions they do not earn this amount in a week. Scarcity of water is the drawback to this field. Fossickers have been working on the Abererombie River, but nothing startling has been discovered; the men, however, are all making a living.

There are two batteries on the field—one at Wilson's Reef and one at Long Swamp. The latter has done a little work; the former, nil.

Tuena Division.

The quantity of gold won by alluvial mining was about 971 oz., valued at £3,889, and from quartz 673 oz., valued at £2,583. In the early part of the year a number of miners left the district to seek work at the Burruga and other copper-mines, as on account of the drought there was no water available for sluicing purposes. Most of the alluvial gold has been obtained from the Abererombie River and Tuena Creek by small scattered parties.

At the Stockyard Claim, Junction Point, a quantity of stone has been raised from the western drive at the 100-foot level, and has averaged over 1 oz. to the ton. The present prospects of the mine are very promising. There have been several small crushings from other claims about Junction Point, but the results have not been up to expectations. Prospecting is still, however, being carried on in this locality.

Some 105 tons were crushed at the Garnett Battery from the Golden Dyke, near Tuena, which yielded 25½ oz. This claim is very easily worked as the country is so soft.

Tennant and party raised 15 tons of stone, which yielded 8 oz. of gold.

Better returns have been obtained from claims held under authority to enter, in terms of the Mining on Private Lands Act. The claim of Thomas Hoare, jun., has opened out very well, and the present prospects are most encouraging. A crushing of 21 tons of stone gave 163 oz., valued at £580, while the yield for the month of December was 36 oz.

McKenzie had a crushing at the Garnett Battery of 100 tons for 54 oz., valued at £193. Since then he has let the claim on tribute. There have been several small crushings from prospecting parties who have taken up old abandoned claims on the same freehold, which showed that wages could be obtained by steady working.

Tranter and party are about to commence working their claim again at Blackman's Creek, about 12 miles from Tuena. The ground prospects well although very hard, and the party are endeavouring to purchase a small crushing plant, as they feel satisfied that they can raise sufficient stone to keep the battery going.

Spalding and Francis are about to place machinery on their 10-acre lease at Jerry's Flat, Abererombie River, with the object of sluicing the ground. This area has been partly worked before, but had to be abandoned on account of excessive water; with proper machinery it should prove a good paying claim.

Rockley Division.

The Caloola Creek Mine, owned by Mr. L. Edgley, has been actively worked during the year. This is a big formation of schistose slate, which yields about $1\frac{1}{2}$ dwt. of gold to the ton. The ore is advantageously mined by the open-cut system, and, being soft and friable, a great quantity of material is put through the Huntington mills. Some 16,000 tons were treated during the year for a return of 1,256 oz., valued at £4,340.

The Mount David Mine was idle most of the year, the Company being in course of reconstruction. Some 2,780 tons of stone were raised, which yielded 554 oz. 6 dwt., valued at £1,883 13s. Sinking is being proceeded with, and it is hoped that the prospecting operations will result in something of higher value being found.

The No Objection Syndicate at Back Creek raised some 1,000 tons of stone, which gave a return of 160 oz., valued at £600.

At the Mount Clarkson Gold-mine, Crozier Hill, Back Creek, the first half of the year was devoted to the erection of a 12-head stamper battery, with tables and all appliances, and to the construction of a large dam. Developmental work has been pushed ahead, and three underlay shafts are now going down. It is anticipated that the report for next year will show a satisfactory return for this heavy outlay.

Work at the Gilmandyke Mine has failed to locate gold in payable quantities, but prospecting is being persistently carried on.

Burrage Division.

McVicar and party, at Golden Gully, Isabella River, unearthed a very rich patch near the surface on their gold lease, from which they obtained about 100 oz. of gold. The patch is small, apparently being a break from the reef which they have been prospecting for some time.

There are about twelve men fossicking on the Isabella River, with varying results.

At Little River there are only a few fossickers, who barely make a living.

At Mount Werong, Munn and party are still sluicing, and making about wages. There are some fifteen other men fossicking in that locality, but without much success.

A company is erecting a plant on the main range at Mount Werong, with a view of sluicing the hill away. This ground contains wash from the surface to about 8 feet deep, and the company will have to bring water from Ruby Creek, a distance of about 2 miles. Some of the plant is now on the site, but no work has yet been done.

Oberon Division.

The only mining of importance carried on in this Division during the year was at Black Bullock Mountain.

T. Buckland continued to raise ore from the lode opened out in 1900, no further discoveries of value being made since that date. The ore is sent to the Smelting Company of Australia for treatment, and 829 tons despatched during the year yielded 566 oz. of gold and 11,780 oz. of silver, representing a total value of £3,680.

P. Ewing and party, also at Black Bullock Mountain, raised 353 tons of ore, which returned 76 oz. of gold and 25 oz. of silver, the total value being £297.

Some 81 oz. of gold were obtained by fossickers.

Canowindra Division.

The principal work done in this Division during the past year has been by The Burdett, Limited. The main shaft has been sunk to the 500-foot level, and the reef has been driven on for 300 feet at the 425-foot level, and 400 feet at the 500-foot level. It is intended to sink the shaft to a depth of 800 feet, and to then open out, when it is confidently anticipated that good results will be obtained.

The Blue Jacket Mining Company, whose property has been hung up for some time, owing to litigation, commenced operations again in November last, and the work undertaken has disclosed most encouraging prospects.

A number of small parcels of stone obtained by prospectors were crushed at the Blue Jacket Company's battery.

The total yield for this Division is estimated at 1,207 oz., valued at £3,920.

Cowra Division.

Boothman and party have been actively carrying on operations at Woodstock during the year, but crushing could not be done continuously, owing to want of water, the party's dam not being sufficient for requirements. A considerable amount of exploratory work has been effected, and although several large reefs have been disclosed, they are not up to expectations.

A discovery of some promise was made at Neila, on the station of that name, about 12 miles south of Cowra, where a quartz vein was opened, which yielded a crushing of ounce stone. The land is private property, but a large number of leases have been applied for.

A lot of work has been done at the Elsie Gold-mine, Binnie Creek, but the returns so far are not payable.

Mandurama Division.

The Gallymont Gold-fields Company has been engaged principally in carrying out prospecting operations, to prove the reef at a depth. The shaft has been sunk from the 250-foot to the 450-foot level, but the reef has not been cut at this point.

The Lyndhurst Gold-mine at Belabula River has worked continuously during the year, largely increasing its output, and supplementing its plant with an additional pyrites roaster and several cyanide vats.

The estimated total yield from this Division is 1,497 oz., valued at £5,328.

Mount M'Donald Division.

At Mount M'Donald mining matters have been somewhat dull during the year, owing to the limited number of crushings which have been put through.

At the Eureka Mine, which is owned by a Hongkong company, the first half of the year was restricted principally to prospecting at the 500-foot level and driving the other levels, but the results were not satisfactory. During the last half-year the mine for a time was under suspension, when a party of tributers secured and worked it until the end of the year for indifferent returns.

The Queen Mines, Limited, and the Caledonian and Great Eastern Mines have been under suspension during the year, and no work has been done. Several parties of tributers have been working on a portion of these Companies' properties, and obtained fair yields.

In addition to quartz-mining, a number of Europeans and Chinese were engaged during a part of the year on the Abercrombie and Lachlan Rivers, with varying success.

Blayney Division.

The Brown's Creek Gold-mining Company, which has held a 25-acre lease for the past five years, is now in liquidation, and the plant and other assets are to be sold.

Mining is proceeding at Forest Reefs and Flyer's Creek, but, as in former years, details are entered under the Orange Division.

Newbridge Division.

T. Raftery, at the Dry Diggings, raised 200 tons of quartz from his gold lease, but, owing to there being no battery near this place, the ore is at grass. Mr. Raftery also raised some 100 loads of washdirt, but could not treat same for want of sufficient water.

J. Collins, on his 25-acre gold lease at the Sugarloaf Mountain, sank a new shaft north of the main shaft to a depth of 90 feet on the reef. He has taken small trial crushings out of different parts of the mine, and located payable stone under foot at the 180-foot level in the main shaft.

Aid from the Prospecting Vote was granted to J. Collins for his No. 1 claim at Sugarloaf Hill, and he was successful in disclosing a promising reef, which it is proposed to further develop.

Some 89 oz. of alluvial gold, valued at £334, were obtained by fossickers during the year from different parts of the district.

MUDGEE MINING DISTRICT.

Capertee Division.

Mining in this Division is confined to fossicking in the Turon River and small tributaries. About fifty men are usually to be found at this work, eking out a bare living.

No reefs are being worked within this Division.

Colbora Division.

Mining in this Division is almost at a standstill. A few men are working at Tucklan, putting in their spare time when not able to obtain other employment, but none of the ground is at present rich enough to pay wages.

Yeo Brothers have for the past two years or more been working a reef at Tucklan; but, as they have limited means, and are physically unable to do very much work, the development of the mine is proceeding very slowly. There is a good body of stone in sight that assays well, and the mine is one that appears to be worth prospecting thoroughly.

No work has of late been done in what are known as the "Cement" claims at Tucklan. There is a very large body of this "cement" carrying gold, and, with a battery on the spot, would doubtless pay fairly well. The nearest battery is 8 or 10 miles distant, and several tons which have been crushed there show that, save for the cost of carriage, fair wages would accrue. Efforts have been made to have a battery erected on the field, but so far without success.

Gulgong Division.

Mining operations in this Division have been carried on only on a limited scale during the year. The Division embraces a large area, and from the old workings and beds of the various streams a fair quantity of gold is annually obtained; but no new finds are recorded, and, so far as alluvial mining is concerned, the mining prospects of this Division are not promising. Agricultural interests are taking the place of mining. Near the town of Gulgong there is a considerable area of first-class agricultural land which was once a network of miners' shafts; the holes have been filled in, the surface cleared, and the land placed under cultivation, with excellent results. Each year shows an increase in the area of land thus reclaimed and cultivated.

With the object, if possible, of locating the deep alluvial lead at Home Rule, the Department put down a number of bore-holes, and details of the results obtained are furnished in the report of Mr. L. F. Harper, which will be found in the Progress Report of the Geological Survey Branch in the Appendix hereto.

None of the various reefs which have at different times been worked within the Gulgong Division have so far proved payable for any length of time.

The Salvation Hill, which is about 2 miles in a northerly direction from Gulgong, is without doubt the most promising mine in the district. There is a large body of highly mineralised stone carrying gold, and some wonderfully rich specimens have been obtained from various levels; but want of capital has so far retarded the development of the property. At present a representative is in London on behalf of the syndicate, endeavouring to raise the capital required to work the mine on a large scale, and it is to be hoped his efforts will be successful.

A considerable amount of work was done during the year at the Sandhurst Mine, Biraganbil. Good prospects have been obtained, and trial crushings of small parcels of stone have yielded payable results, but want of capital has compelled the lessees (who are *bonâ fide* working miners) to suspend work. From three to four men worked constantly at the mine for several months for no monetary return whatever.

Hargreaves Division.

Alluvial mining in this Division is mostly confined to old ground and stream beds. Owing to the continued dry weather the miners have been enabled to obtain access to the ground along the banks of the creeks, and a fair quantity of gold has been obtained in this way. During the year two small rushes took place at Boiga and Wardong, and some fine nuggets were obtained; but the ground is very patchy, and good luck attended but very few of the miners.

Spratt and party have worked continuously on their leases during the past year, and very rich stone is occasionally met with. The reef is patchy, but is said to be improving as depth is attained; 1,000 tons of quartz crushed yielded 750 oz. of gold, valued at £2,625. The average yield, extending over a period of three years, is given as 14 dwt. to the ton.

Hogan and party have done good work at their reef on Tucker's Hill, and the last crushing of 14 tons yielded over 2 oz. per ton.

Scott and party have abandoned their leases at Hampden and Homeward Bound, after expending over £2,000 in profitless work.

The total yield obtained in this Division during the year was 1,328 oz. of gold, valued at £4,443.

Mudgee Division.

Alluvial mining within this Division is confined to fossicking in old workings and along the beds of streams.

During the month of December a small rush occurred at Grattai, some good colours having been found in a shaft sunk on private land owned by Messrs. James and Reeves. About twenty men went to work, but the holes bottomed proved duffers, and the ground has been practically deserted.

A few men are working in Beaudesert Paddock and making fair wages, but there is no extent of untried ground.

The only reefing that is at present being done within the Division is at the quartz claim held by Mrs. Martin and party, on private land at Cullenbone. From four to five men have been engaged continuously at this mine during the past twelve months, and about 60 feet of sinking and 150 feet of driving have been done. The reef varies in thickness from 4 to 12 inches, and is carrying good prospects of gold, but a considerable amount of work has yet to be done before its permanency is proved.

Stewart and party are holders of an adjoining claim, on which a sloping drive has been carried along the line of reef for 150 feet; but, owing to lack of funds, work has been suspended for some months past. Good prospects were obtained in various parts of this reef. Steps are being taken to raise capital to resume work.

Windeyer Division.

Satisfactory results have been obtained from quartz-reefing during the year.

C. W. Winter and party, the owners of the Golden Lily Mine, have sunk a further depth of 100 feet, and have obtained payable stone at the 300-foot level. They have driven 700 feet, and have good milling stone for the whole distance, and there is sufficient profitable stone in sight to keep the mine going for years. The party have at present about 300 tons of stone at grass, which is estimated to yield from 22 dwt. to 4 oz. per ton. The yield from this mine for the year was 667 oz. 17 dwt., valued at £2,670, and does not quite compare with last year's returns. This is accounted for by the large amount of development work undertaken, and to the shortage of water for crushing.

The reef in the Golden Lily Mine has been tested to the boundary of T. Muirhead and party's lease, with good stone for the whole distance, and Muirhead and party are sinking to cut the reef at 100 feet, at which depth they expect to meet the same class of stone. There is said to be a proposal on foot to float these two properties into a company. This is considered to be a move in the right direction, and would give a great stimulus to the district.

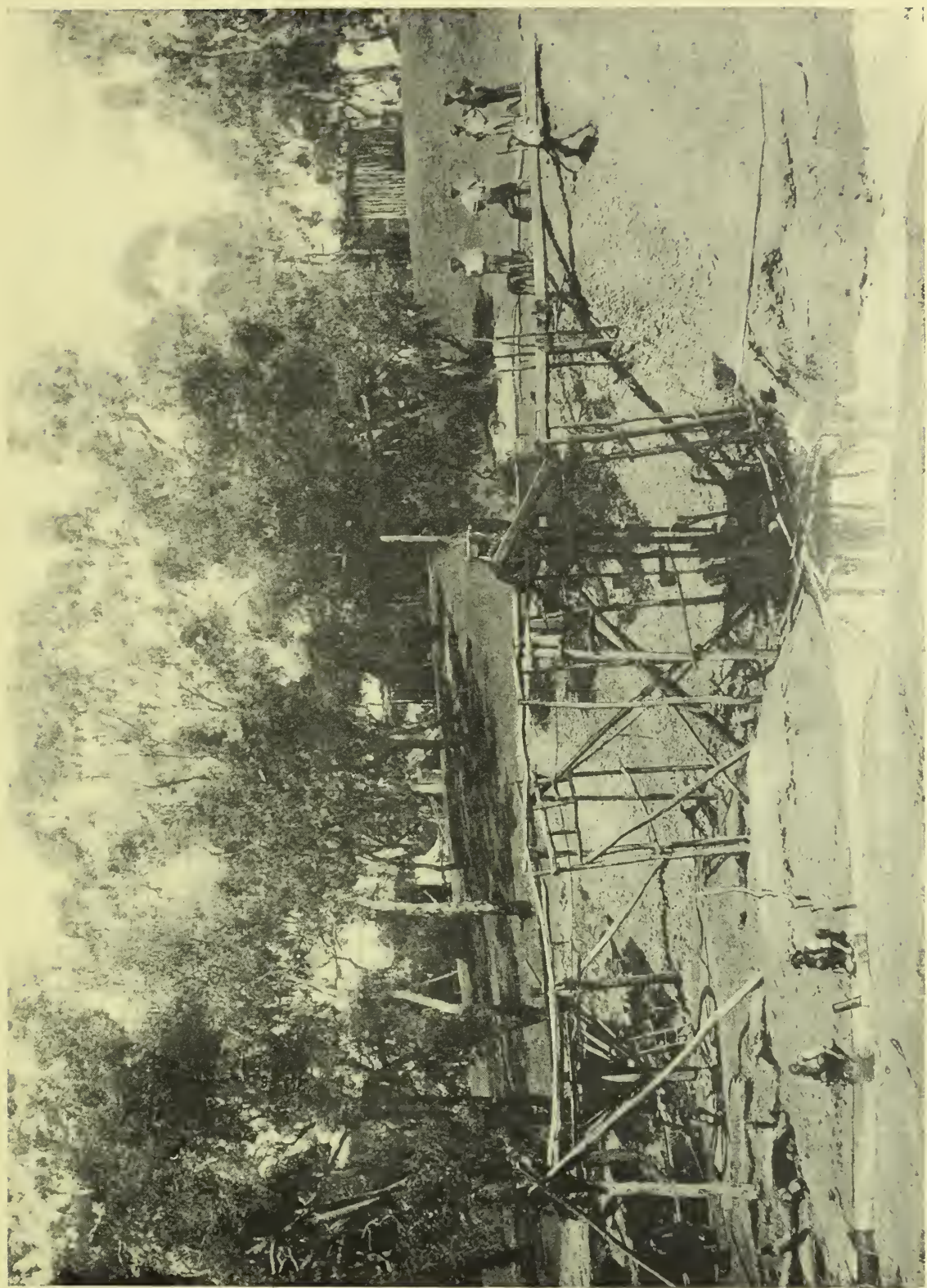
G. W. Grosse and party have only recently been able to cope with the water in the Gully Claim. They are now raising good stone, and 10 tons were put through for a yield of 40 oz. of gold.

James Clarke and party have been sinking on their property, but, being poor men, are not able to continue. They have placed their lease in the market, and have obtained suspension of labour on these grounds. Three other prospectors have sunk shafts, but only struck leaders which were not payable.

W. Lefley and party, the owners of the Golden Gate Mine, have a promising holding, from which something over £7,000 worth of gold was obtained, but they were swamped out by water, and consequently work has been temporarily stopped.

The returns of alluvial gold purchased go to show a decline. One party on private lands has been on payable gold for the whole year.

The total yield from this Division for the year was 1,798 oz., valued at £7,080.



GOLD-WASHING OPERATIONS, HELVETIA, GULGONG.

Peak Hill Division.

At the Peak Hill Proprietary Gold-mining Company's works, vats have been erected, and the tailings which were tipped back into the mine to fill up the workings six years ago are being raised and treated by cyanide at a profit.

Negotiations have been entered into for the disposal of the three principal mines here to an English syndicate, but, so far as is known locally, the sale has not been concluded.

No new reefs have been discovered, and mining prospects in this locality are not encouraging. Small parcels of alluvial gold have been obtained by a few fossickers, but the living made was a very poor one.

Messrs. Anderson and Hunter's Cyanide Works has employed an average of 10 men throughout the year in connection with the treatment of the sand and slimes.

At the Myalls United Gold Mine, at M'Phail, work was carried on continuously through the past year until the month of November, when a number of hands were discharged, and the battery run one shift per diem only. An additional 20 head of stampers have been added, and when certain drives connecting a shaft some distance south of the mine workings with the principal shaft are completed, it is anticipated that operations will once again be in full swing.

At Tomingley a fair amount of prospecting work has been done during the year by small parties of miners along the line of reef, but no discoveries have been made during the year worthy of special mention. Two small batteries, one a 10-head and the other a 5-head of stamps, have been kept employed during the greater portion of the year, and the returns have been satisfactory.

Capital expended judiciously in this part of the Peak Hill Division would, it is thought, yield good returns; and although the past year has not been a prosperous one, it does not follow that the field is worked out.

Wellington Division.

During the year 6,726 tons of quartz were raised, yielding 4,322 oz. of gold, valued at £14,525, and also 940 loads of alluvial, yielding 512 oz., valued at £1,894. The value of the plant in the division is estimated at £14,860.

The crushing plant at the Mitchell's Creek Freehold Gold Estate Mine, at Bodangara, was at work until the 7th of June last only; during this period 6,246 tons of stone were treated for a yield of 3,852 oz., valued at £12,657. Since that date the battery has been shut down for reconstruction, and a large and improved plant, valued at £10,000, is in course of erection. During the suspension of crushing operations, developmental work underground was actively carried on.

At the Commonwealth Mine the lode has been proved about 20 feet wide, with oxidised ore on the surface containing gold, silver and lead, and sulphide ore at the water level, carrying gold, silver, lead, copper, and other metals. Some 480 tons of stone treated during the year gave a return of 470 oz. of gold. Efforts are being made to obtain machinery to treat the ore locally, as at present it has to be sent to the smelting works at Dapto or Cockle Creek.

At the Jawbone alluvial field some 40 or 50 miners are at work, and some of the claims are giving good returns.

TAMBAROORA AND TURON MINING DISTRICT.

Hill End Division.

Mining in this Division is very dull. Alluvial mining is confined to the banks of the Macquarie and Turon Rivers, where a considerable number of fossickers make a bare living.

During the year, several parties were working the Hawkins' Hill reefs with varying success. Some rich shoots of gold were obtained by Carver and party and the Ackermans, but these appear to have cut out, and very little gold is now being obtained in this locality.

A few months past Trevethick and party and Culnane and party struck some very rich stone on a line of reef between the Turon and Macquarie Rivers, and obtained several crushings, yielding from 7 to 8 oz., but the rich stone was near the surface, and latest accounts of the reefs are disappointing, the stone becoming poorer as depth is attained.

A considerable amount of work has been done at the Canton Reef, between Tambaroora and Hill End, but so far without return. The reef is said to be improving, and may yet become payable.

The reefs at Root Hog, on the Macquarie, and at Chambers' Creek are being worked with but poor results. Operations at Chambers' Creek were suspended for some time, but have recently been resumed, and the party are very sanguine of the prospects.

Rylstone Division.

There is practically no gold-mining done in this Division, several men, however, find employment by fossicking in the creek beds.

Sofala Division.

At Upper Turon, Palmer's Oakey, Crudine and Turondale, several parties of fossickers have been engaged in the old workings, but they have only just made a living as the dry season has enabled but little sluicing to be done.

At Moonlight Hill, Dunkel and Tacke put through about 12,000 loads of wash-dirt, and they are satisfied that good wages could be made if a supply of water were available. The race leading to this claim is about 10 miles long, and cost upwards of £1,000.

The Turondale Consolidated Company has a holding of 86 acres, embracing the Homeward Bound, Shakespeare, and Britannia Mines, at Turondale (late Box Ridge). The Company has been carrying on active operations and has pumped out the old workings and done a considerable amount of sinking, &c. The veins disclosed are very promising, and a large quantity of stone has been raised and crushed, but no returns have been furnished. It is to be hoped that the Company will get a substantial return for the capital invested.

The mine held by the Razorback Gold-mining Company, Limited, is situated about 12 miles east of Sofala. Work has been confined to prospecting and deepening the shaft, &c., and no ore has been treated.

There were three dredges at work in this Division during the year, and details of operations will be found under the dredging notes.

The estimated total yield for this Division during the year is 4,192 oz. of gold, valued at £13,789.

Stuart Town Division.

The gold output of this Division for the year (exclusive of dredging returns) amounted to 2,167 oz., valued at £8,293, and comprised 1,583 oz. from alluvial, and 584 oz. from quartz. 1,794 tons of stone were treated in order to obtain the latter result, the average per ton being about 7 dwt.

The alluvial output has been considerably hampered, consequent on there being very little water available for sluicing purposes. The rainfall for the year amounted to 23.13 inches, or 10 inches below the average, the greatest falls being recorded for the months of March (5.05 inches) and August (4.12 inches). In the other months of the year intermittent showers only fell, and they proved of little value to the alluvial miner for sluicing purposes.

During the greater part of the year the two principal mines of this Division—The Wentworth Goldfields Proprietary Company's "Mascotte," and the Emma Company's "Post Office"—have been idle, consequent on suspension of labour conditions having been granted. The former Company sought suspension for the purpose of allowing time to complete the amalgamation of this Company with the D'Arcy Wentworth Company, but it is understood that it has since decided to abandon the holding. The reason of the application by the Emma Company was on the ground of reconstruction. In consequence of the closing down of these mines there was an unusual exodus of the mining community from this Division during the early part of the year, most of them seeking employment at Cobar, but a great number have since returned. Notwithstanding the departure of so many miners a substantial amount of work was performed by the several small holders of leases and claims, as the following returns will show: At Scott's Battery, parcels of stone, ranging from 4 to 65 tons, amounting to 385 tons in all, were treated for various parties, and yielded 194 oz. 10 dwt. of retorted gold, valued at £747 4s. 4d.; at Boehme's Battery, lots aggregating 583 tons, were crushed and yielded 178 oz., valued at £688.; the Golden Gully Battery treated 81 tons for 34 oz. 10 dwt., valued at £134. Included in the above figures are the following crushings:—Hocking, Eddy and party, 60 tons for 25 oz. 11 dwt., valued at £96; and Valentine Herrmann, 453 tons for 117 oz. 9 dwt., valued at £469 16s.

Apparently the most encouraging mining operations during the year were those carried on by Messrs. Burgess and J. Donnelly at the Goodrich Goldfield Reserve, near Yeoval, in the western portion of this Division. The lease was applied for about the middle of the year, and is worked by the two lessees. Three lots of stone, viz., 7½, 6½ and 6 tons—20 tons in all—were trucked to Dapto for treatment, resulting in a gross yield of about 60 oz. (£230 worth of gold), averaging

averaging 3 oz. to the ton. Three shafts have been sunk—40, 30 and 33 feet, respectively, with a total of a little over 100 feet of driving. Two of the shafts are on the reefs from which the foregoing yield was obtained. One reef consists of gossan, trends north and south, and is about 20 inches wide at water level. The second reef carries both gold and copper, varying in size from a few inches to a foot in width, and shows copper freely. The country chiefly consists of granite, with occasional belts of diorite.

The Golden Gully Company's 25-acre lease was cancelled during the year, and two areas, of two and three acres, of the cancelled portion were taken up by Mr. John Pearce. It is anticipated that work will soon commence on these holdings.

A cyanide plant has been erected at the Golden Gully, and is owned by Mr. Haugh, of Parkes. The tailing heap from the Golden Gully Battery is being operated on, but no results are available. It is understood, however, that the returns are not up to expectations.

SOUTHERN MINING DISTRICT.

Araluen Division.

There is a very satisfactory increase in the gold yield for the past year as compared with the previous year. This is occasioned by the progress made by the dredging industry, and which is referred to in detail elsewhere.

The output for 1901 was 12,380 oz., valued at £47,695, as against 4,903 oz., valued at £18,810, for the previous year. The drought experienced during the closing months of the year under review caused ground sluicing to be almost suspended, and the yield obtained from the ordinary alluvial workings was only 676 oz., of the value of £2,603.

No quartz mining was done during the year.

Braibrood Division.

There is no quartz mining carried on in this Division, and, owing to the dry weather and consequent want of water throughout the whole year, no alluvial mining has been done.

Major's Creek Division.

Quartz mining is the principal industry at Major's Creek, 730 tons having been raised during the year, and 200 tons treated, which yielded a return of 1,074 oz., of the value of £4,175, while 584 oz., of the value of £2,190, were obtained from alluvial workings, making a total of 1,658 oz., valued at £6,365.

The principal part of the quartz was sent to Dapto for treatment, as from its complex character it could not be successfully operated on at Major's Creek. The yields from several of the parcels were very satisfactory, some returning over 4 oz., one over 9 oz., and one over 17 oz. to the ton. The latter was from Heazlett and party's claim, where a very small vein, a finger or two in breadth, was found split into two portions, one at each side of the shaft, and at a depth of over 100 feet it ran out altogether, when work was discontinued.

A reef known as the "Snobs," which has been in several different hands at various times, was recently held by a Melbourne Company; during the year, however, this Company got into difficulties, and the mine was sold by the Sheriff's officer, when it was bought by the workmen previously employed, by whom it is now carried on. There are over 200 tons of ore at grass, some of which is now being sent to Dapto.

Another old reef, "Dargue's," was prospected by an English Company for some time with a view to purchase, but work has been discontinued owing to the low grade of the ore.

A syndicate has recently been formed for testing yet another old reef, known as the "United Miners." It is too early, however, to say anything about its prospects.

All sinking at the head of Major's Creek is in solid granite, and the veins being only one or two inches wide, it takes a long while to get a ton or so of stone out, and generally does not repay the expenses incurred.

Little River.

No alluvial mining, other than dredging, has been done to any extent, as the want of water prevented the miners from working, no rain of any consequence having fallen during the year.

At Mongarlowe the Day Dawn Gold-mining Company has done good work, and has succeeded in cutting the reef at a depth which gives every promise of yielding payable results. This should cause an impetus to mining in this District, as most of the reefs have been worked down to water level only.

Dredging operations have been in progress in this Division, and details will be found in the notes under that heading.

Nerriga Division.

The absence of sufficient water for washing purposes has prevented fossickers from engaging in their usual occupation, and very little work has been done. The quantity of alluvial gold won is inconsiderable.

As regards quartz mining some prospecting is being carried on at Timberlight, but no finds of any importance have yet been made.

Goulburn Division.

As far as can be ascertained, about 466 oz. of alluvial gold, valued at about £1,821, were obtained in this Division during the year by fossickers who just manage to eke out an existence. No other gold-mining appears to have been done.

Nowra Division.

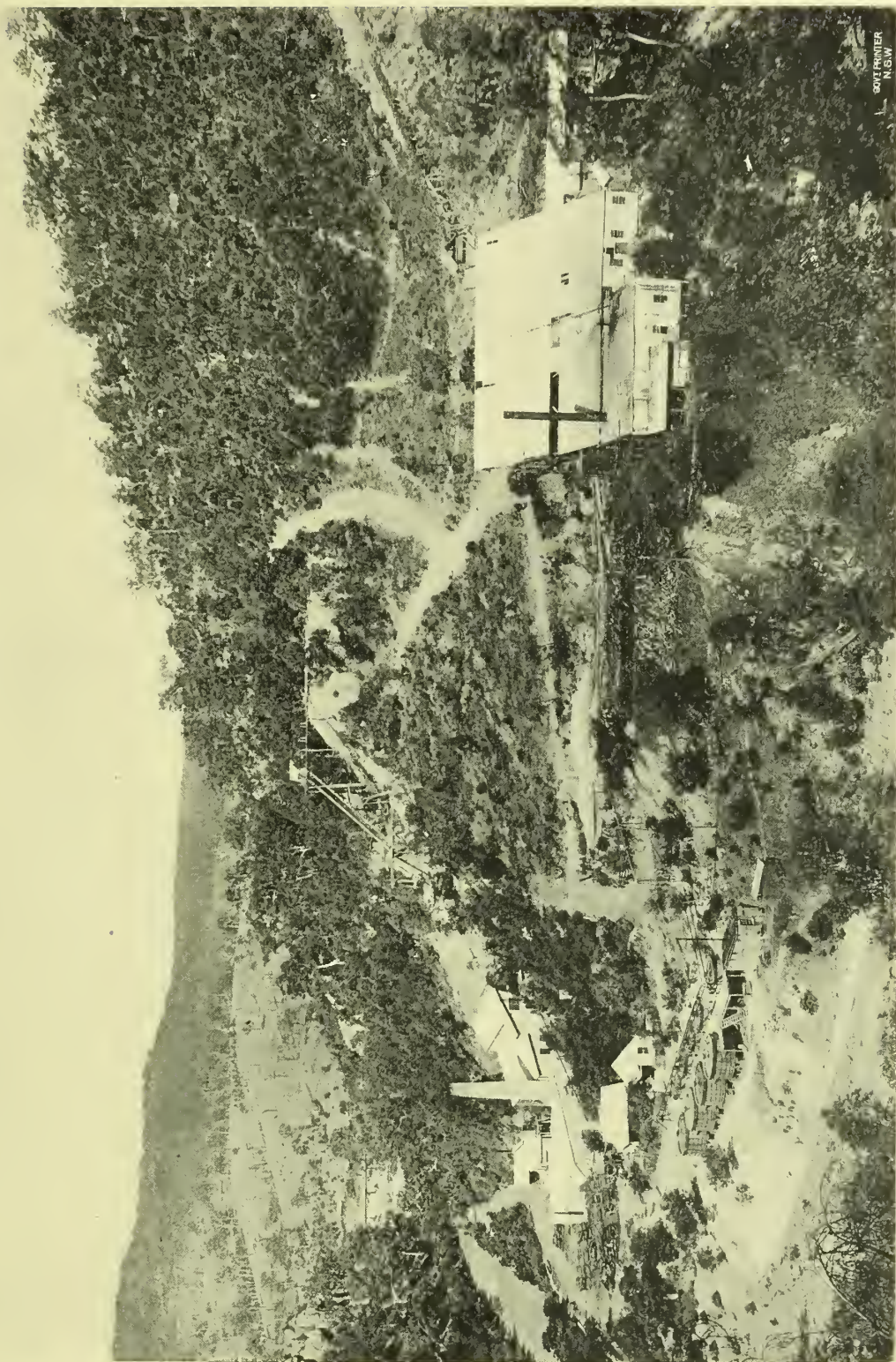
During the past year matters have been very quiet at Grassy Gully, and at the end of the year there were only four gold leases in force.

The Grassy Gully Gold-mining Company put through 850 tons of stone, for a return of 434½ oz. of gold, valued at £1,263 6s. 5d. This stone was taken out of the stope during the previous year. About 130 feet of driving and sinking has been done during the year, with the object of picking up a continuation of the rich chute, which was cut off by a slide at 120 feet in depth. The stone outside this chute has proved fairly poor. A centrifugal pump has been added to the cyanide plant for treatment of the slimes. Work at the close of the year was being confined to the slimes and the development of the mine at both levels, in the hope of cutting the payable chute below the slides. During the year the Company had an average of seventeen men employed.

At Yalwal the Homeward Bound Gold-mining Company has been kept in full work for forty-four weeks of the year; operations were suspended during the months June and July, owing to the scarcity of water. The amount of ore treated by the respective processes was as follows:—Stone crushed and amalgamated, 18,493 tons, yielding 1911·35 oz. of gold, valued at £5,253 1s. 11d., which gives an average value of 5s. 8d. per ton; cyanided, 8,140 tons, yielding 1105·96 oz. of gold, valued at £2,448 16s. 4d.

Thus the total value of the production is £7,701 18s. 3d., and, comparatively, is very nearly the same as last year, but the average shows an improvement, for the stone crushed during the past year represented eleven months' work as against thirteen months in the previous year. Considerable development and dead work has been effected at the mine during the year. The walls of the quarry have been made more secure by the removal of the overburden, some 4,500 tons having been sent to the top; the depth has now been increased to the level of the original tunnel driven by the Company at the first onset. When this floor is cleaned up, the walls will give a vertical depth of 100 feet. A new tunnel has been driven from the western side of the hill immediately below the old tunnel, 375 feet, and 110 feet below the floor of the quarry, the dimensions of same being 7 x 5 feet. During the progress of this work two leaders were crossed, each giving assays of 4 dwt. gold per ton, but no material has yet been treated from this level. It is proposed to extend the tunnel still another 15 feet eastwards. The new machinery installed during the year included a "Worthington" steam pump, which raises the water for cyanide, sluicing, and battery requirements. The electric light installation has proved a great success. The year has been financially and generally a successful one to this Company; the development has given more ground for future operations, and the work done about the walls of the quarry should make the position of the miners much safer.

The Yalwal Gold-mining Company had a great amount of developing work to do to render the mine safe to work in, and this is responsible for the small returns.



HOMeward BOUND AND PIONEER BATTERIES, YALWAL.
(Homeward Bound Battery and Cyanide Plant in foreground, and Pioneer Battery in middle distance.)

Mining operations have been mostly concentrated on the Pinnacle and Eclipse Mines; both of these mines have been opened out so that work may be carried out on the "open cut" system. Similarly to the Homeward Bound and the "Pioneer" Mine of the Yalwal Gold-mining Company, huge quantities of mullock had to be removed in connection with this work, and this caused the battery to be hung up for lengthened periods; in fact the battery has not worked more than ten weeks during the whole of the year. The Company was at date crushing full time with 40-head battery, and has a good face of stone to operate on. On the whole matters are looking much brighter, and the Company hopes to have a good year. The following are the returns from May 13th to December, 1901, from the "Eclipse" and "Pinnacle" Mines, the property of Mr. A. Hay:—500 oz. of gold won, of the value of £1,553 17s. 9d., from 4,500 tons of stone.

A geological survey of the Yalwal field was made by Mr. Geological Surveyor Andrews during the year, and his report, together with a map, has been issued as No. 9 of the "Mineral Resources Series."

Nelligen Division.

There is little to report in connection with this Division. Several reefs are being prospected, but the results obtained are anything but satisfactory.

Bateman's Bay Division.

The White's Hill Gold-mining Company had suspension of labour for the last six months of the year, as the whole of the original capital had been expended, and the shareholders were anxious to obtain additional funds. All the work done has been principally in the nature of development. Main drives have been put in through the rock to the wash, and a few loads have been taken out from time to time to obtain prospects only.

Day and White are driving a tunnel into a large basaltic hill at the head of Mogo Creek. The tunnel is in a distance of 500 feet into the hill, and the party are now crosscutting. They propose to crosscut 200 feet east and west, either side of the main tunnel. So far they have not obtained much gold, and the want of water has been a great drawback. There is a lot of ground in this locality which should, it is thought, with an economical method of working, pay wages.

Thomson and Ladmore are sinking at Tranter's Gully, near the Cabbage Tree Creek; the ground is about 76 feet deep, and a little wet.

Henderson, Evans, and party, endeavoured to test the flat along Cabbage Tree Creek, in the vicinity of the town, but the water proved too heavy. They obtained a little gold from the first paddock, but they were afterwards compelled to abandon the ground on account of the water.

Nearly all the ground is deep and wet, and requires to be worked by persons possessed of considerable capital. All the shallow ground was worked years ago, and the Mogo diggers have for years past existed by fossicking around the old workings; but these are now exhausted, and during the latter part of the year the men have mostly turned their attention to other pursuits. Should the deep ground prove to be payable, and capital be forthcoming, a great impetus would be given to this place.

An attempt has been made by Carter and Williamson to open up a few reefs in the vicinity of Tomakin, but so far they have had no crushings.

McDonald and Belletts, who were working on two reefs a little back from the Tomakin road, have had a trial crushing, which only paid a trifle over carting and crushing expenses.

Moruya Division.

Mining matters in this division are dull.

Mr. F. Guy's gold and silver leases were floated into a company, and a considerable amount of money spent in prospecting, with but poor results; the cost of treatment of the stone is heavy, and at the close of the year the mine was shut down.

The Bimbimbi Proprietary Mining Company, at Bimbimbi, near Mogo, crushed 861 tons of stone for a yield of 803 oz. of gold valued at £2,662. The mine has been let to tributers, who appear to be doing satisfactorily.

There are several areas held at Tomakin, near Mogo, but no results have been obtained up to the present, prospecting work only being carried on.

At the Donkey Hill Mine very little work is being done.

Nerrigundah Division.

Quartz mining in this Division has made great strides during the year.

Good work has been done at the new field at Mount Utopia, and a large number of men are employed prospecting and developing the various leases.

Egan and Thomas, at Mount Utopia, have been working since March last. The lode varies from 4 ft. to 6 ft. in width, and 133 tons crushed during the year yielded 106 oz. 4 dwts. of gold, valued at £450.

Scymour and party, at Mount Utopia South, have sunk a number of shafts on their two holdings, but the ore is highly mineralised and is not amenable to battery treatment, 60 tons returning 11 oz. 11 dwts. of gold, valued at £46.

Pollock, Motbey, and Reed, also at Mount Utopia, have a lode varying from 1 ft. to 3 ft. in width, and 73 tons of stone crushed yielded 46 oz. 14 dwts. of gold, valued at £188. The last crushing taken from the 40-foot level in the No. 2 shaft averaged 21 dwts. to the ton.

Motbey and party, at Mount Utopia, obtained 140 oz. 16 dwts. of gold, valued at £575, from 261 tons of stone.

A number of satisfactory returns for small parcels from Mount Utopia is also reported.

Utting, Thompson, and party, at Nerrigundah, have driven a tunnel a distance of 298 ft. and cut the reef, which is from 6 in. to 1 ft. wide. This reef was previously worked from the 170-foot shaft, but with the tunnel the owners now expect to obtain much more satisfactory results; 47 tons of stone were crushed for 104 oz. 16 dwts. of gold, valued at £430.

The Bombo Gold Mining Company has been engaged principally in prospecting work during the year. Experiments have also been conducted with a view to obtaining a higher extraction of values from the pyritic ores.

Latty Brothers, at Tinpot, Tuross River, have a reef 2 ft. wide and a vein about 6 in. wide on their 10 acre lease; this latter shoot is about 12 ft. long and averages about 10 oz. to the ton, having realised as high as 12 oz. per ton. On their 4 acre lease the reef is about 10 in. wide, and the average yield is about 3 oz. per ton. The yield for the year from this mine was 430½ oz., valued at £1,740, obtained from 196 tons of stone.

Clark and Smith, at Riverview, Tuross River, 2 miles south-west of Mount Utopia, have two shafts, one down to a depth of 32 ft., and the other to 60 ft. The reef is improving with depth; the owners are very sanguine as to their prospects, and have taken up more ground adjoining. Eighty-six tons were crushed for a return of 107 oz. 6 dwts, valued at £450.

The total yield from this Division for the year was 1,664 oz. 7 dwts. of gold, valued at £6,840.

Wagonga Division.

The principal mine in this Division is held by the Dromedary Gold Mining Company (No Liability), and which for the year had an output of 500 tons of ore for a return of 785 oz., valued at £2,626 11s. The ore is complex, containing copper, bismuth, sulphur, and iron, and the concentrates are treated at the Dapto Smelting Works.

Several other mines are also being worked on Mount Dromedary. All the veins on this field become highly mineralised at a depth, while they are narrow, averaging only a few inches in width.

Another mine which promises well is the McDonald Gold Mine. It is situated on the northern bank of the Wagonga River, and for the year crushed 614 tons of ore for a return of 220 oz., valued at £771 8s. This is a very large felsitic lode, intersected by numerous quartz veins. Two Huntington mills have been erected to treat the ore, which can be mined in very large quantities.

A quartz reef is being opened up with Government assistance at Whittaker's Creek, and, on present prospects, promises well.

The other quartz mines in this Division are the "Belle of Australia" and that held by Cox and Party on the north side of the Wagonga River, also Bailey's, W. Braithwaite's, and the "Ratshead" on Ratshead Creek.

A fair amount of prospecting for reefs and lodes has been done during the year.

From alluvial 169 oz. 4 dwts. 11 grs. have been won, valued at £634 13s. 9d.

The land at the head of Kianga Creek is being looked forward to as likely to return good yields of gold when the tail race now being constructed by the Government is completed. The race is being brought up from the Kianga Lake. At present the water is too heavy to admit of systematic working of the alluvial ground by the ordinary miner, even during the driest parts of the year. It is expected that on completion of the work a number of men will find profitable employment for some considerable time.

A pumping plant has been erected by Mr. Palmer with the idea of working the deep channel of this creek, but so far he has had no returns.

The other places at which alluvial has been obtained are Mount Promedary, Makin's Creek, Ratshead Creek, Whittaker's Creek, &c.

Milton Division.

There is practically nothing to report in connection with mining in this Division.

Three or four men are engaged prospecting or fossicking, and, as far as can be ascertained, the result of their labours is nil.

Cobargo Division.

The only mining carried on during the past year consists of fossicking in old and abandoned claims at Montreal; from this source about 20 oz. of gold were obtained.

There are no gold leases in existence, and no prospecting has been done.

Wolumla Division.

The only gold lease in force in this Division is that held by the Wolumla Gold-field Company (Limited); on this area a considerable amount of prospecting has been done by the present Company, with poor results.

Prior to taking over the leases some good results were obtained by various owners, and it is generally believed locally that the mine still contains rich ore. Suspension of the labour conditions was granted for a period of six months, to enable the holders to raise capital to make further exploration.

Several authorities have been issued to search for gold on private property, but so far no reefs of any importance have been disclosed.

Pambula Division.

The chief mine in this Division, held by the Falkner's Gold-mining Company, has not been worked during the past twelve months, owing to protracted litigation.

The Pambula Mines (Limited), has been working up to October, the returns being 271 oz. from 640 tons of ore, and 240 oz. from 418 tons of tailings, treated by cyanide process, the total value of the yield being £1,708. This mine has been systematically worked, and a deal of developing carried on. Suspension of the labour conditions for six months was granted, to enable the company to raise further capital and carry on some proposed further prospecting, and the erection of necessary machinery to cope with water.

At the Treasury Mine, Wyndham, a battery is being erected, and the work of raising stone will shortly be commenced; the ore is of low grade, but can be obtained in large quantities, and should produce good results.

At Burrogate, 5 miles from Wyndham, some good prospects have been obtained, and several leases have been applied for. A few rich patches have been discovered in this locality, and it is believed a vein of some magnitude exists; the country is very rough and difficult to prospect.

A company has lately been formed to work on the private property of Mr. Keys, where good results were lately found.

A few authorities to search on private property have been issued, but no results are yet to hand.

About 511 oz. of gold, valued at £1,768, were won in this Division during the year.

Delegate Division.

There are only two quartz claims now being worked at Brown's camp, and about 50 tons of stone were raised during the year for a yield of 80 oz.

A few Chinese are fossicking at Craigie with but poor results; this is the only alluvial work done in the Division.

Bega Division.

There are a few men engaged fossicking at Sandy Creek, and a little gold has been won from the bed of the creek; in all about 1,000 loads have produced 50 oz., realizing £193.

Yambulla Division.

In this Division a fair amount of prospecting has been done with good results. The Yambulla field extends over an area of 15 miles, by 8 to 10 miles, and is traversed by a number of narrow fissure veins, running east and west, many of which are still untested. To date there are but a limited number of practical miners at work, the drawback being that the means of properly treating the refractory ores are not convenient to the field; a movement was on foot at the close of the year to erect a cyanide plant at Yambulla, and this should enable the output to be materially increased, as the miners were unwilling to undertake the risk and expense of sending ore to Cockle Creek or Dapto for treatment.

About 60 claims and leases were in full work, the majority of which have produced payable gold.

The shallow sinking has made the field productive for the practical miner unprovided with capital, and the erection of additional crushing plants in course of transit to the field at date will be the means of inducing further prospecting operations. Many of the recent discoveries are 8 to 10 miles from the existing batteries, and the cost of carriage is very expensive, while the limited number of carts available prevent these finds from being effectively worked. There are numerous reefs adjacent to the settlement which have not been fully prospected or worked out.

So far no mining has been done at the deeper levels on account of the highly mineralised state of the ore, which cannot be locally treated, the deepest shaft being 150 feet.

The output of gold for the year is about 3,424 oz., valued at £11,869, and at the present rate of discoveries a material increase should be shown in the returns for this year.

This field has undoubtedly great probabilities in the near future.

A detailed report on the field by Mr. Geological Surveyor Jaquet appears in the appendix to this volume. The following particulars of operations conducted during the year will no doubt be of interest:—

Parish of Yambulla.—The battery of the Yambulla Mining Company has been kept well employed, and a large quantity of ore has been treated. The deepest shaft is down to 150 feet, and it is intended to test the deposit by sinking to the 200 feet level.

James Haugh has obtained very satisfactory returns from his several holdings. He has a 10-head stamper battery, with Wilfley concentrating tables.

J. G. Gough, from portion 6, crushed 58 tons of ore for 47 oz. gold, valued at £141. The shaft is down 55 feet.

McCloy and Walz had 149 tons of ore treated locally from portion 7 for 232 oz. of gold, valued at £696; and forwarded to Cockle Creek 10 tons, which returned 25 oz., valued at £100; they also despatched 27 cwt. of concentrates which had not been treated at date; but which assayed 9 oz. of gold per ton. The deepest shaft is 63 feet.

J. G. Barron, portion 9, raised 195 tons of stone, which yielded 104 oz. of gold, valued at £312. The shaft is down 50 feet, and a drive has been put in from the bottom level for a distance of 120 feet east.

P. McCloy and others, portions 15 and 16 (amalgamated), treated 16 tons for 14 oz. 3 dwt., valued at £42 9s., and had 40 tons of mineralised ore at grass, the deepest workings being 52 feet.

C. James, portion 14, treated 95 tons of ore for 106½ oz., valued at £276.

G. H. Hite and others, portion 50, raised 20 tons of ore, of which 12 tons were treated for 9 oz. of gold, valued at £24 15s. This gold was confined to a small shoot of about 4 ft. 6 in., at a depth of 33 feet.

John Stott, portion 22, treated 2½ tons of ore for 2 oz. 19 dwt., valued at £8 7s. 9d. This shaft is down 56 feet.

J. H. Power, portion 18, treated 10 tons of ore for 10 oz. gold, value £25.

Jarvis and McCloy, portion 27, treated locally 46 tons for 70 oz. of gold, valued at £210, and forwarded to Dapto 5 tons, which yielded 19 oz. 14 dwt., valued at £78 16s.; the deepest shaft is down 47 feet.

Roberts and others, portion 32, treated 122½ tons of ore for 325 oz. gold, valued at £989 5s. The 80-foot shaft was being continued at date, and good ore raised therefrom.

Mackenzie and Jensen, portion 48, crushed 132 tons for 56 oz. of gold, valued at £137 4s., and have 60 tons at grass, expected to yield 7 or 8 dwt. per ton. This mine is worked by an open cut into the hill, and being a large reef the ore can be cheaply mined.

Greenlees and Hyde, portion 70, treated 81 tons for 93 oz. gold, valued at £279, the shaft being down 50 feet on a reef averaging 6 inches wide. On this lease there are four different lines of reef, which have been opened to a depth of from 10 feet to 35 feet; two of these reefs underlay north, and two south.

J. Hewitt, portion 2, treated 18 tons of ore for 10 oz. 15 dwt. of gold, valued at £30 8s.; the depth of the shaft is 34 feet.

N. Jensen, M.T., portion 9, treated 80 tons for 160 oz. gold, valued at £340, the deepest shaft being 40 feet. The prospects of this claim are very good, the ore averaging 2 oz. of gold per ton. The owner has a 3-head battery, water-wheel, and small cyanide plant, about 2 miles from the mine.

Lawrence and others treated 8 tons from their quartz claim for a yield of 4½ oz. of gold, valued at £10 16s.

C. Jess raised 7 tons from his claim, of which a crushing of 5 tons yielded 4 oz. 17 dwt. of gold, valued at £12 15s.

G. F. Grant, portion 73, raised and treated 50 tons of stone for 52 oz. of gold, valued at £145.

A. and F. Earl, G.L., App. 4, Yambulla, had 16½ tons of ore treated for a return of 19 oz. gold, valued at £50 7s.; their shaft being down 40 feet.

P. Lindwall, portion 17, from 9 tons of stone obtained 4 oz. of gold, valued at £12.

A. Lindwall, from portion 39, raised 86 tons for a yield of 72 oz., valued at £216; and from portion 45, 20 tons for 36 oz., valued at £108.

W. C. Ryan had 4 tons treated from his prospecting area for 3 oz. 7 dwt., valued at £10 1s.

A few miners are engaged on the river banks searching for alluvial, and some 45 oz. of gold have been obtained from this source.

Parish of Nungatta.—P. Delaney raised and treated 121 tons of ore for a yield of 350oz. gold, valued at £1,150. This stone was obtained from a formation on the surface, the open cut being 50 ft. x 40 ft., and from 10 to 14 feet deep. There is a large quantity of seconds not yet treated.

A number of applications have been lodged for permits to search on the area adjoining Delaney's, and which is held as a settlement lease.

Parish of Waalimma.—R. Durham, the holder of gold lease, portion 4, reports having raised and treated 33 tons of ore for a yield of 53½ oz. of gold, valued at £155 3s.; the depth of the shaft is 50 feet.

Curry and Miradian, on their Miner's Rights claim, obtained 18 oz. gold, valued at £39 11s., from 9 tons of stone, taken at a depth of 14 feet, from a reef 2 feet to 2 ft. 6 in. wide.

Best and Wilson crushed locally 12½ tons of ore for 52 oz. of gold.

Frogmore Division.

The mining industry in this Division is practically at a standstill. There is only one gold-mine working, and the quantity of stone raised was inconsiderable, and the prospects are anything but encouraging. There are a few fossickers in the locality, but they have not been fortunate enough to strike anything payable.

LACHLAN MINING DISTRICT.

Cargo Division.

A number of gold leases were applied for during the year in the vicinity of Copper Gully, but no work has been done on any of the areas.

All the machinery on the Ironclad Mine has been sold, and the lease has been cancelled.

McMahon Brothers, at the Commonwealth Mine, have done no work during the year.

Henry Moore has a promising claim at Mount Durward, 12 tons of stone, treated at Cockle Creek, returning 47 oz. of gold valued at £188, and assays have given as high as 7 oz. to the ton.

Tinnock and Nobbs, from their 3 acres lease, near Copper Gully, obtained 80 oz. of gold, valued at some £300, from 20 tons of stone.

The total yield from this Division, during the year, is estimated at 155 oz. of gold, valued at £571.

Cudal Division.

During the year the only lease worked was that held by Palmer and Williamson, in the parish of Nangar. Operations on this portion have been principally confined to prospecting. The shaft has been sunk 107 feet and the party are driving at this level, having received aid from the Prospecting Vote. They have 10 tons of ore at grass.

Applications were lodged for a 10-acre and a 4-acre gold lease, but no work has been done on these portions, and the prospects of the Mining Industry in the Division are not promising.

Forbes Division.

With the exception of some prospecting at the Bald Hills, 3½ miles north of the town, very little alluvial mining is being carried on, while but a small amount of fossicking has been done.

As regards quartz mining, there are three or four very promising properties on what is known as Sinclair's lode. These mines are about 3 miles north of Forbes, and a short distance from the railway line to Parkes on the west side.

The first of these mines is that of the Lachlan Gold-fields (Limited), and was taken up a few years ago by the present company. It has been steadily developed under the management Mr. A. J. Dunstan. The main shaft, which has been sunk to a depth of 390 feet, is situated 60 feet east of the lode, and levels have been driven at 70, 150, 230, and 310 feet. The sinking of the main shaft to a greater depth is being proceeded with. At 150 feet a main drive has been extended north and south for a distance of fully 1,000 feet through a massive ore body of considerable thickness, and which is highly payable. At the 310-foot level a drive has been put in 240 feet, and the lode averages from 15 to 18 feet wide. The strike of the lode is north, 20 degrees east, and can be traced the entire length of the property, a distance of 1,800 feet. To ensure the battery being constantly employed in the future, a large portion of the past year has been devoted to opening up lower levels, and the other leading stopes, therefore the output of gold has not been so large as in previous years. The ore faces now open compare favorably with those of former years. The grade is about the same and the ore bodies, apparently, as permanent. The mine, in addition to being self-supporting, has paid a good sum in dividends. The lode consists of a hard bluish quartz, averaging from 15 to 30 per cent. of iron pyrites. The gold is extracted by amalgamation, after crushing in the Stamper Battery, followed by concentration and treatment of the tailings by cyanidation. The concentrates are disposed of on assay value to the customs smelting works. About one-third of the gold is saved by amalgamation, one-sixth by cyanidation, and half by concentration. The output of concentrates from five head of stampers has previously only been about 100 tons per month; the company was at the close of the year running ten head, and, it is understood, will at an early date have twenty head running full time, treating 250 tons of concentrates per month. Some sixty men are employed on the mine, and this number, it is stated, is likely to be largely increased. All the indications at this date point to this property as likely to yield handsome returns for years to come.

Immediately to the north of the Lachlan Gold-fields, a block of ground is being developed by a Company known as the "Nil Desperandum No Liability," under the management of Mr. Nicolas, a miner of great experience, and who holds a large interest in the mine. This property consists of 28 acres. The lode has been proved the whole length of same, a distance of 23½ chains. Prior to the formation of this Company various shafts had been sunk on the lode, down to 90 feet, the water level, and in each shaft gold was got, assaying from 2 dwt. to 2½ oz. per ton. When the various leases became the property of the Company and were amalgamated it was decided to sink a main shaft west of the lode so as to get it at a depth. At the present time the main shaft has been sunk 217 feet, the dimensions being 10 feet by 3 ft. 3 in., with three compartments—pump and ladder shaft, and two hauling shafts, and is centred the whole of the way. At the 110-foot level a chamber has been cut to open east on the lode, and at the 207 foot level a chamber was opened west. A drive is being put in north from the 200-foot level along the lode. This will connect with what is known as Hollinger's shaft, at a point 200 feet from the main shaft, and also provide ventilation. Different assays taken from the drive at the 200-foot level have given from 2 to 25 dwt. per ton. In Hollinger's shaft there is a lode 7 feet wide at the 90-foot level. The Company has erected poppet heads and

has

has a 12-horse power portable winding engine, also a Cornish boiler, air compressor, rock drills, pumps, &c., in position on the mine; but, from want of rain, it has not been possible to commence operations. A 5,000-gallon tank has been excavated on the property, and so soon as water is available work will be proceeded with.

Various other shafts have been sunk and the lodes prospected with very encouraging returns. The capital of the Company is £6,250—125 shares at £50, all taken up by the original shareholders.

Adjoining on the north of the "Nil Desperandum," another mine is in process of being floated. The area is 30 acres, having a total length of 2,870 feet on the course of the lode, which is running the same way as that in the Lachlan Gold-fields Mine. A good deal of prospecting has been done on this property, and the assays are considered very satisfactory. In appearance the lode is very similar to that in the "Lachlan Gold-fields." The main shaft is 127 feet deep, and at the 87-foot level, a cross-cut opposite the shaft showed the lode to be 14 feet wide, from which assays gave 16 dwt. 12 grs.,—19 dwt. 4 grs., 9 dwt. 8 grs., and 16 dwt. 8 grs. of gold per ton. About 350 tons of ore have been taken out in the work of development, and with a suitable plant can be turned to profitable account. The property has other features of interest but the foregoing would seem to indicate that it is well worth a thorough test, and this can only be done by the aid of capital. It is very probable that this lode will be worked still further north.

Parkes Division.

The principal mines working at Parkes are the Dayspring, the Kohinoor, and the Phoenix.

The Dayspring Gold-mining Company has sunk a new shaft, 317 feet deep, on the underlay, with a double tramway for cages to the bottom. There is another tramway overhead which conveys the ore to the 20-head stamper battery. The Company has two tanks, one with a capacity of 1,000 cubic yards, and the other 1,500 cubic yards. The 1,000-gallon tank is connected with the Huntingdon Dam, $\frac{1}{2}$ miles away, for boiler purposes. The Dayspring Mine has been working under various owners for about thirty years. The present Company has had it twelve months. The machinery is driven by a 40-horse power boiler, and includes two Willley Concentrators and a stone crusher. At the close of the year a crushing of 800 tons was being put through, which was estimated to yield 6 dwt. per ton, and this yield will be payable under the economical system of working adopted by the Company, as the machinery was erected on the estimate that the stone would give this return. The mine is situated $1\frac{1}{2}$ miles north of Parkes, at a place known as the Currajong.

The Kohinoor Mine is situated about 1 mile south of Parkes, and is owned by a registered Company, and has an area of 16 acres. It has been worked for the last ten years, and is the deepest mine (vertical) in the District, the shaft being down 800 feet. From the 650-foot to the 750-foot level the mine has not been payable; from the 450-foot to the 650-foot level the stone averaged 9 dwt. per ton. The present prospects of the mine are stated to be favourable. The reef is 3 feet wide, and appears to carry payable gold, although the reef has been 10 feet wide in places, and yet was not payable.

The Phoenix Mine is a registered Company, and consists of an 8-acre lease. It has been let on tribute for three years, but now the Company has taken the mine over. There has been one crushing of 90 tons for a yield of 85 oz., and 100 tons are at grass. This is the mine once so well known as "the Hazellhurst," from which very rich stone, yielding £60,000 worth of gold, was obtained.

In the mine adjoining the Phoenix, on the east end, a good deal of work has been done. The shaft has been sunk to the 500-foot level, and cross-cuts put in at various depths, but so far no important discoveries have been made. The highest return was $\frac{1}{2}$ an oz. per ton from a parcel of 36 tons. So much valuable stone has been obtained in this locality, that it would appear to be well worth the Company's while to prospect the reefs at a depth. It may be added that one great drawback to this mine is that the country is very hard and expensive to work.

Going south from the Phoenix Mine there are several leases taken up on the Forbes Road, on what is known as Possum Gully.

In Steen and party's Mine the shaft is 50 feet deep, and the reef is from 6 inches to 18 inches wide. They crushed 241 tons for a yield of 357 oz. In this locality work is being vigorously carried on by the various parties, who appear satisfied with their prospects.

Still further south, on the Forbes Road, some $2\frac{1}{2}$ miles from Parkes, is Knox and party's mine, known as the "Wild Cat." The main shaft is 230 feet, and two other shafts are down 95 feet and 200 feet respectively, and they are connected with the main shaft. The reef is from 2 to 4 feet wide, and the yield per ton has been on an average 12 dwt. This party has crushed 1,100 tons of stone, and there are 100 tons now at grass. This appears to be a valuable holding.

In March last, Pearson and party reported payable alluvial gold at a place known as the "Secrets," 7 miles from Parkes, on the Corradgery Road, the depth of the sinking being 90 feet, and the yield 4 dwt. to the load. A good many claims were taken up, but the prospector's was the only one which gave anything like payable results.

At what is known as the Old London Lead, about 5 miles west of Parkes, the run of gold, after being worked for a period of eight years by various parties, was left for about 12 months, when Pepper and party then took up an extended claim and sunk a shaft 115 feet deep, from which they raised 1,000 loads of dirt, for an average yield of 6 dwt. to the load.

There are two claims on payable wash, and two more getting a little gold, about 17 men working in all. It seems probable that the lead will be followed into some private lands, held as a homestead selection. Operations were hung up at the close of the year, as there was no water available for puddling the dirt raised.

The total yield for this Division during the year is estimated as 4,137 oz., valued at £14,893.

Fifield Division.

At Fifield, the progress of alluvial mining was hindered considerably owing to the want of water.

At Carlisle two quartz claims were opened up, both showing fair prospects.

Condobolin Division.

The mining industry in this Division is in a very languishing condition.

At the "Alma" Mine, a property mentioned in former reports, a crushing during the year of 158 tons of stone gave an ounce per ton. This stone had to be carted a long distance, but it is understood that negotiations are all but complete for the sale of the mine, and that the purchasers intend to erect a battery on the area. This will enable stone not sufficiently rich to pay for carting any distance to be profitably treated. The surface stone in this mine has been very good, and so far, nothing but surface work has been done. The sinking of a main shaft, with the object of opening the mine up properly, would meet with general approval locally.

In July last, operations were resumed at Cugong, where some few years ago some rich stone was discovered. There are two shafts on the property, both about 100 feet in depth. One hundred and thirty-one feet of driving has been done, and a cross drive put in 72 feet. The prospects are fairly good, and the mine is said to be under offer to a syndicate.

Alectown Division.

Except for a little fossicking, mining in this Division is at a standstill. There are a number of miners in the District, but they seek other more settled employment during the greater part of the year. There are a great many reefs in this locality, but so far, only surface work has been done on them.

On the Monte Carlo line, stone was obtained that went as much as 20 oz. to the ton, yet the mine has been idle for a long period.

Grenfell Division.

Gold mining in this Division is confined principally to Sandy Creek, Ironbarks, Warraderry, Quondong, Bumbaldry, and Grenfell. About October last a quartz lode was discovered at Bumbaldry, about 17 miles from Grenfell, and trial crushings have given satisfactory results. Mining, however, is not in a very flourishing state in this District at present; a number of the miners have found employment in sleeper-getting for the Railway Commissioners, and this latter work is proving more remunerative than mining.

Murrumburrah Division.

The gold yield from this Division shows a falling off as compared with the previous year. About 181 oz. of alluvial gold were obtained by fossickers from the beds of the various creeks.

Prospecting for reefs is being carried on at Nubba and Demondrille.

At Garangula all the mines are abandoned. Messrs. Cooper and Sons have a cyanide plant on the field, and are putting through the stone, &c., which is at grass.

Gundagai Division.

The yield of gold obtained in this division during the year was 6,324 oz. 13 dwt. 9 grs., valued at £23,529 9s. 9d., showing a decrease of 4,737 oz. 7 dwt. 8 grs. on the previous year. The decrease appears to have been caused by Robinson and Rice's, and Kenny's mines at Reno being under suspension, and the fact that the Prince of Wales Mine is almost worked out.

The Howell's Exploration Company, Limited (the Sybil Mine at Reno), treated 340 tons for 587 oz. 12 dwt., valued at £2,164 5s. No payable ore was opened up by the additional sinking and driving done, and consequently all progressive work was abandoned. Stopping in the known payable chute of ore became unprofitable, and the men employed thereat were paid off; the tribute system was then commenced, and has proved highly remunerative. Some 223½ tons of stone were stoped and crushed, for a return of 587 oz., out of the proceeds of which the tributers received £1,364 19s. 6d., and the company £799 5s. 6d. Future work at this mine is likely to be confined to that of a few tributers extracting the payable chutes or leaders. In conjunction with Howell's Consolidated Gold Mines, Limited, this ground was tested to a depth of 1,486 feet by the diamond drill. The test was unsatisfactory, and, strengthened by the results obtained by previous sinking and driving, tends to show that the lode pinches out between the 500 and 600 foot levels.

At Howell's Consolidated Gold Mine, Limited (Prince of Wales Mine at Reno), 3,767 tons were treated for 3,369·52 oz., valued at £12,454 17s. 4d. The unsatisfactory yield from the ore extracted in 1900, viz., 3 dwt. 10 grs. per ton, led to a change of working in 1901; that is to say, the old policy of mining for quartz was abandoned for that of mining for gold; and whereas 25,728 tons milled in 1900 produced 4,435 oz. of gold, by the selection of the ore 3,767 tons milled in 1901 yielded 3,869 oz. of gold. This enabled the mine to pay working expenses, but no profits were earned for distribution among the shareholders. The outlook for the shareholders, who have paid £150,000 of capital, is not encouraging, because, in addition to the fact that no profits were earned, the prospecting and development work in 1901, consisting of 1,668 feet of sinking, driving, &c., cost £2,914 17s. 4d. As previously mentioned, this ground was tested by the diamond drill to a depth of 1,486 feet, when drilling was discontinued. The nature of the core after passing 1,475 feet bore a strong resemblance to the conglomerate forming the footwall of the ore channel, and the belief is that the ore channel was passed through, and it contained neither quartz nor auriferous material at the point penetrated by the drill. Employees on wages stoped 1,324 tons for 769·11 oz., and tributers 2,443 tons for 2,299·95 oz., while 300·46 oz. were obtained from concentrates. In future it is intended to follow the lenticular chutes or leaders of ore and to extract the gold so long as the gold produced pays the working expenses of the mine. Since the Prince of Wales Mine became the property of the Howell's Consolidated Gold Mines, Limited, 72,464 tons have been treated, producing 23,342 oz. of gold, valued at £86,786 10s. 8d.

Robinson and Rice's mine at Reno has been under suspension for some time, as it is under offer to an English company, and there is every probability of the sale being completed.

J. H. G. Gevney and party's mine at Wagrabilly was under offer to the Howell Exploration Company, Limited, but the sale fell through.

Henry Groth, the holder of an authority to enter under the Mining Laws Amendment Act for 22 acres at Tarra-bandra, raised 25 tons of ore for 146 oz. 15 dwt., valued at £532. The shaft is down 114 feet, showing good gold.

Booth's United Gold Mines, Limited, at Coolac, did a little work from August to September, but no ore was treated.

Several authorities to enter under the Mining Laws Amendment Act, and permits under the Mining Act of 1889, were granted during the year.

Temora Division.

The yield of gold for the year was 1,458 oz., valued at £5,599, being 669 oz. less than that for 1900. 140 oz. were obtained from quartz, and the balance was entirely the result of tailings, treated by cyanide.

A. L. Deutscher has been sinking upon his gold-mining lease with a view of testing the alluvial wash at a depth. Operations have been temporarily suspended owing to want of funds, but work will be resumed again.

Several authorities to enter under the Mining Laws Amendment Act were issued, and a little prospecting has been carried on both upon private and Crown lands.

Outside capital and experience are required to test the auriferous tracts in this Division.

Cootamundra Division.

The quantity of ore treated for the year was 2,785 tons for 1,788 oz., valued at £5,261 16s. 5d. In addition, 1,427 oz., valued at £2,965 0s. 8d., were won from tailings treated by the cyanide process, which makes the total yield of gold for the year 3,215 oz., valued at £8,226 17s. 1d. All the mining was at Cullinga.

James Boxsell and party, The Christmas Gift, treated 2,496 tons 15 cwt. at their battery, for 1,626 oz. 14 dwt., valued at £4,688 11s.; and, in addition, 14 tons 16 cwt. were sent to the Dapto Smelting Works, which yielded 59 oz. 10 dwt., valued at £229 10s. This party also sold a quantity of tailings for £510 11s. A considerable amount of developing work was done during the year, otherwise the yield would have been greater; there is every prospect of a great improvement this year, as the mine looks well. A body of mineralised ore is coming in at the 160-foot level, which is valued at about £10 per ton. The tailings will be treated by cyanide upon the ground, and also the slimes. If water runs short for battery purposes, the mineralised ore will be sent to the smelting works.

The battery treated 239 tons 16 cwt. for the public, which gave a return of 86 oz. 4 dwt. 15 grs.

Venables and party raised and had treated 36 tons 3 cwt. for 17 oz. 14 dwt., valued at £60 16s. 1d. This is the only party besides the Gift that appears to have a prospect of anything payable.

A number of authorities to enter were abandoned, but some have been retaken, with the hope of striking the Gift lode.

Wyalong and Wyalong West Divisions.

As usual, these Divisions must be treated as one, the line dividing the two being undefined, and both comprise the Wyalong goldfield. For reference by way of comparison, it is again well to give the yield since 1894 in tabulated form:—

Year.	Tons treated.	Oz.	Value.
			£
1894	6,358	9,649	35,946
1895	15,634	24,497	91,864
1896	18,297	33,495	130,000
1897	30,750*	34,370	137,490
1898	30,940*	34,582	138,328
1899	15,116	44,675	178,700
1900	22,387	32,425	129,700
1901	23,858	21,717	86,870
Totals.....	163,340	235,410	928,898

* These quantities include sand, slimes, and concentrates.

It will be seen that although there were 1,500 tons treated during 1901 in excess of the year 1900 the yield is nearly one third less, but this will readily be understood when the fact is explained that the greater part of the stone treated was "thirds," which had been raised in former years. It was discovered that this stone would pay handsomely for treatment, and the mine-owners were also anxious to get the mullock out of their way. During the time this mullock or "thirds" occupied the batteries, the mine-owners were able to devote their energies to sinking, prospecting, and opening out the rich lodes, and they are all now ready to produce and treat rich ore of which there is a large quantity in sight. From the present appearance of the field it may with safety be asserted that 1902 will be a record year for gold production.

The limited water supply is responsible for the batteries and other reduction works being thrown idle for about two months in every year.

The railway from Temora to Wyalong must have a beneficial effect on this field as the richness of the reefs at the deeper levels is being fully maintained and several previously abandoned claims and leases have been reopened with most satisfactory results. Neeld's No. 1 is still the richest mine on the field and has the best and most up-to-date machinery. The main shaft has been sunk from the 300 to the 400-foot level, and on opening out, the rich mineral lode was disclosed, which goes to prove that this reef will probably go down to a considerable depth.

In point of value and richness the True Blue Company is on similar stone at a depth of 560 feet, and the earnings for the year exceeded £17,000. Judging by results the following mines have done well—Shamrock-enm-Waratah, Golden Fleecce, Junction, Great Britain, Lucknow, Gipsy Queen and Golden Eagle, Currajong, Lady Grace, Operator, Sunlight, Kohinoor, Appeal, Mallee Bull, White Reef, Barrier, Summersgill, Harry's Find, Christmas Gift, Santa Claus, Young Australia, Red Flag, Easter Gift, and Kimberley.

The Golden Treasure and Brilliant amalgamated are still sinking to tap the Mallee Bull line of reef.

The depths of the main shafts are as follows:—Neeld's, 400 feet; True Blue, 560; Lucknow, 532; Bantam and Lady Grace, 700; Junction, 656; Shamrock-enm-Waratah, 527; Golden Fleecce, 420; Klinks, 510; Kimberley, 260; Easter Gift, 250; Golden Treasure, 530; Great Britain, 525; Mallee Bull, 459; Klondyke, 470; Santa Claus 175; Appeal, 260; Red Flag, 170; Union, 210; Daisy, 400; Gipsy Queen, 350; Kohinoor, 245; Summersgill's, 200; Young Australia, 230; Operator, 270; White Reef, 500; Barrier, 280; and Lucknow, 530.

There are about 800 miners on the field, of these fully 300 are prospecting.

Hiawatha.—This portion of the field is 10 miles north from Wyalong and is situated on private lands, and a number of authorities to enter in terms of the Mining on Private Lands Act have been issued. The quantity of stone available justified Mr. West removing his 10-head stamper battery to that place, which has been kept fully employed. The stone yields free gold from 10 dwts. to 2 oz. per ton, which pays handsomely.

Notwithstanding that the repeated attempts to discover payable alluvial have been fruitless, there are still a few who continue the search.

An interesting discovery of tin lodes was made at Buddigower during the past year, and details will be found in this volume under the notes on tin.

The estimated value of the machinery erected on the Wyalong field is £60,500.

Barmedman Division.

The mining town of Barmedman is situated 22 miles north of Temora and 18 miles south of Wyalong. The Temora-Wyalong railway will run through the town, and there cannot be any doubt but this will give a great impetus to the mining industry. The returns for this year show a marked advance on the previous year. In 1900 the yield of gold was 745 oz. 10 dwt., value £2,922 13s., whereas, in 1901, the returns show 2,246 oz. 1½ dwt., value £8,344 11s. 2d.

The Fiery Cross Mine continues to be the principal employer of labour, and it is satisfactory to know that the spirited proprietors are likely to be well repaid for past expenditure. A large number of men are constantly employed, but the water is still very troublesome, the pumping machinery having to be kept constantly going day and night. There is a 10-head stamper battery erected on the mine, which is kept working on the stone raised.

The battery on the White Cross Mine crushed 430 tons for the public, which produced gold to the value of £1,400. No work is being done in the mine; but Mr. W. B. Wilkinson, the energetic owner of the mine and plant, has been cyaniding slimes and tailings with very satisfactory results.

Jackson and party, Tucker and Wentworth, and Steffani and party, besides others, have been on reef, though somewhat patchy, stone north and west of the Fiery Cross and White Cross Mines, but owing to the heavy flow of water have not been able to test their ground below the water-level.

Kildary.—This place is about 30 miles due east of Barmedman, and is within this division.

About two years ago a party of prospectors discovered a belt of reefs on private lands. General authorities to enter were applied for and granted. Kerr and party (formerly Reilly and party) from 41 tons obtained by battery treatment 122 oz. 13 dwt. 12 grs. gold, value £427, and are deepening their shaft. The McGeech Brothers have authorities covering 20 acres, and have applied for a dam site, machinery area, and water-race, with the object of erecting a battery to work a 9-foot reef, said to average 10 dwt. per ton.

Yalgogrin Division.

Although the gold reefs in this division are rich, yielding on an average during the past six years 2 oz. free gold per ton, there is very little enterprise or energy amongst the miners. These men work fitfully; yet, despite this fact, 946 oz. of gold were obtained during the year, of the value of £3,069. Very few of those working are skilled miners—a fact which operates prejudicially to the development of the field. The railway to Wyalong, when constructed, will, no doubt, cause a marked improvement in mining on this field.

A number of lots of second-grade ore were treated at the local battery of ten head of stampers, owned by Mr. Gough, who has considerably reduced the charges for treatment.

It was expected a strong company would have acquired the Pieanniny, Coon, Democrat, Autoerat, and adjoining properties; but the negotiations fell through.

Hill and Turland have a very promising property in what was formerly known as Waldron's paddocks, while a rich chute of gold has been discovered quite close to the town, on the south-western side. The developments up to the present have been very satisfactory.

Nariak.—This place is about 14 miles south-westerly from Yalgogrin, where Mr. Stanley discovered a reef on his own property. He erected a 5-head stamper battery, and has met with fair success.

Reeflon Division.

During the year a little prospecting has been carried on in the neighbourhood without satisfactory results. A gold lease, of 7½ acres, was worked for the first six months, when 233 tons, giving a return of 115 oz. of gold, valued at £446, were raised. The lessees are unable to work below the water-level, and, in consequence, the lease has been practically abandoned. The water is very heavy, and although it is known that good reefs exist at a depth, capital is required to cope with the water. In former days, all the reefs were payable to the water-level, and the ground down to that depth appears to have been worked out.

Young Division.

There has been no improvement in mining operations in this Division during the past year, and a further falling off in the quantity of alluvial gold won has to be recorded.

The results for the past five years are as follows:—

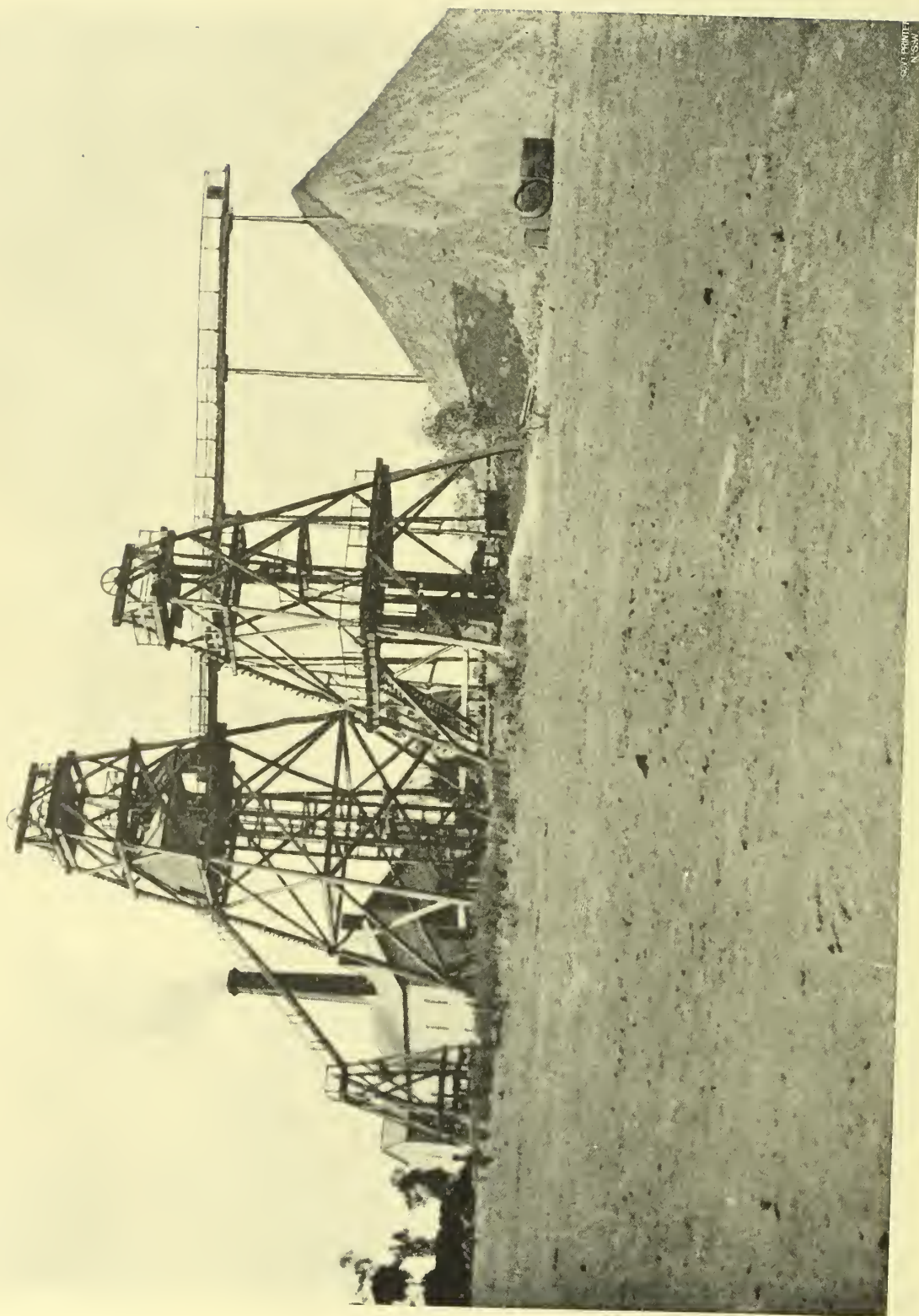
Years.	Yield.
1897	2,134 oz.
1898	1,507 oz.
1899	1,237 oz.
1900	1,059 oz.
1901	777 oz.

The gold has been obtained principally by fossicking in a desultory fashion, which is only resorted to when more remunerative employment is not obtainable. Some of the men so employed obtain fair results whilst the majority earn little more than a living. It was anticipated that the deep alluvial deposits would have been tested before now by means of suction dredging, but unfortunately the operations of the Burrangong Dredging Company have been hampered and delayed from unforeseen causes, and the company at the close of the year was still 9 feet from the wash.

Narrandera Division.

Messrs. Smith Brothers have commenced operations at Grong Grong Reefs on the area previously worked by the Harry Smith Gold-mining Company, but which had been idle for over twelve months. The party have a tribute from the company and are sinking a new shaft; the indications are said to be very encouraging.

Mr. W. G. Elwin is still working on his lease, and during the year he received assistance from the Prospecting Vote to sink his shaft 50 feet deeper, but no good results have as yet been disclosed. The formation is sandstone and slate with quartz leaders.



THE COROWA DEEP-LEAD GOLD MINE, COROWA.

Government aid was also granted to A. Wright on the Gladstone line of reef, and sinking was proceeding at the close of the year. There is a quantity of promising looking stone at grass, but no crushing has been done.

Messrs. Golding and party have a cyanide plant on their lease at Grong Grong, and have obtained very satisfactory returns. The party signify their intention of sinking a main shaft with the view of cutting the Gladstone Reef, which was worked with good results in the past.

Owing to the scarcity of water and grass in this Division, prospecting operations are greatly retarded.

Junee Division.

Very little mining has been done in this Division during the year, and there are only four mines in operation, viz., the Dust Hole Mine, Junee Reefs; H. J. Baker and party, Junee Reefs; and Baker and Charlton, and T. Charlton, at Wantiool near Junee.

At the Dust Hole Mine, Junee Reefs, owned by the Howell's Consolidated Gold-mines (Limited), the stone raised varied from a few inches in width to $3\frac{1}{2}$ feet, averaging about 1 foot, and the crushings have yielded from a few penny-weights up to $2\frac{1}{2}$ oz. per ton. The reef occurs in a series of disjointed lengths, all having nearly the same bearing, and pinches out gradually, while no continuous walls exist. Copper pyrites and galena are frequently found associated with the gold. This mine has been tested to a depth of 250 feet, and across both sections. On the northern section small veins (N. and S.) distinct from the main formation, have yielded small crushings up to $3\frac{1}{2}$ oz. per ton. Work at this mine was at the close of the year practically confined to prospecting, and it will probably be closed down.

The total quantity of stone raised by H. J. Baker and party, Junee Reefs, for the year was 110 tons but only 44 tons were treated, which gave a return of 54 oz. 19 dwts. of gold, valued at £219 16s. Suspension of the labour conditions for three months was granted in November, to enable the owners to raise capital to procure machinery to work the mine.

Baker and Charlton, of Wantiool, are mining for alluvial, as is also T. Charlton, although on this latter claim quartz mining is carried on in addition. The total gold yield of this Division for the year was 859 oz., valued at £2,882. At the present time there are no indications of a revival in mining in this district.

TUMUT AND ADELONG MINING DISTRICT.

Albury Division.

There are several prospecting claims in this Division, but no serious mining has been done during the year. The Black Range Quartz Battery crushed 68 tons for a return of 88 oz. 12 dwts. of gold.

Corowa Division.

The Corowa Deep Lead Mine is the only one at work in this Division. During the past year, the main lower level drive was extended from 770 feet to 1,134 feet. At 1,100 feet a rise was put up 44 feet, and an intermediate drive about 20 feet below the wash has been put in to a length of 230 feet. From this drive two bores have been put up into the wash overhead, one at 1,200 feet, the other at 1,300 feet from the shaft. The former reached the wash at 22 feet above the top of the drive, the latter at 20 feet, where a fair prospect of gold was obtained. Not much water was met with by either bore.

Up to October 31st, the date of the last balance sheet, the total amount expended on the mine by the Company was £24,860.

The drives are securely timbered; a permanent truck-road is laid down the whole length, and all the underground workings are well ventilated by air-pipes, the air being forced through by water power.

Walbundrie Division.

During the past year only one mine "The Goodwood," has been worked, and that for only a few months. About 25 tons of quartz and 600 tons of mullock were raised and crushed, and afterwards treated by the cyanide process, the quantity of gold won being 47 oz. 6 dwts.

The mines on this field have not at any time been systematically worked or prospected to a depth owing to the want of capital, and if this were forthcoming, there is every reason to believe that good results would follow, as very encouraging prospects have been obtained.

Germanton Division.

Work at the Four-mile Creek Gold-field has met with but indifferent success during the year. The only return received is that from J. G. Massie, who obtained some 32 oz. of gold valued at £95.

Adelong Division.

The yield of gold obtained during the year was 8,899 oz. 11 dwts. 11 grs., valued at £34,156 15s. 6d.; 16,311 tons of quartz yielded 8,093 oz. 8 dwts. of gold, valued at £31,093 4s. 6d., and the balance, 806 oz. 3 dwts. 11 grs., valued at £3,063 11s., was obtained from alluvial—a decrease of 2,870 oz. 17 dwts. 22 grs., valued at £8,460 2s. 9d., is thus shown on the output for the previous year.

"The Gibraltar Consolidated Gold Mines Limited" treated 15,376 tons for 7,070 oz. 10 dwts., valued at £27,308 10s. During the latter part of the year the mine was worked upon tribute, and the results were satisfactory. Some development work was also carried on in the way of driving, sinking winzes, &c.

During the year the company purchased the "Caledonian," "Caledonian Extended," and "Challenger Mines," and from the prospecting and development work since carried out the prospects seem to be favourable, and all these properties will soon be thoroughly tested and worked.

The Reefer Battery treated for the public 935 tons of stone for a return of 1,022 oz. 18 dwts.

The alluvial gold won was obtained by sluicing, dredging, and fossicking.

"The Grahamstown Gold Estates" purchased the "Jennings Pump" dredging plant at Grahamstown, and near the end of the year started operations; it is confidently expected that the future results will be satisfactory.

Several authorities to enter under the Mining Laws Amendment Act were granted for lands in the parish of Wondalga, and Purcell and Ferguson raised $2\frac{1}{2}$ tons of stone from their holding which yielded 124 oz. 3 dwts. Work is still being carried on, and this field is likely to prove payable.

Several mines in this Division are under suspension, arranging for the introduction of capital and machinery, but should be at work again shortly.

Tumut Division.

The rainfall in the spring was in excess of the average of several past years, and consequently a somewhat increased amount of work has been done in the way of ground sluicing. However, the supply of water has been far from sufficient for continuous operations.

As regards quartz mining there is little to report. A large number of payable quartz reefs are known to exist in this Division, but expensive machinery on the ground and capital to work them are required.

Messrs. Mason and party, who hold 38 acres at Billapaloola, obtained 280 oz. of gold, of the value of £1,012, from 913 tons of quartz. They have erected a five-head stamper battery on the ground.

The amount of gold won, as far as can be ascertained, was 864 oz. 5 dwts. 19 gr., valued at £3,206 8s. 11d. This shows a slight increase on the previous year. Some 913 tons of quartz were treated for 280 oz. of gold valued at £1,012, the balance was alluvial, and was the result of ground sluicing and fossicking.

The dredge at Adjunbilly was removed during the year and the lease abandoned, and the other dredges have not yet started work.

Reedy Flat (Bullock) Division.

As far as can be ascertained the yield of gold for the year in this Division was 861 oz., valued at £3,340. This is less than that for the previous year.

Some 830 oz. were alluvial, valued at £3,220, obtained by sluicing and fossicking, and 31 oz., valued at £120, were obtained from quartz. Reefing has not yet proved payable, but it is thought that with the introduction of capital better results would be obtained.

Tumberumba Division.

During the year there has been an increase of miners in this Division. This is evident both from the number of miners' rights issued—381 as against 351 for 1900—and from the noticeable fresh arrivals. The rich finds of gold at Cherry Hill are responsible for the whole of the increase.

The working of the gold deposits under the basalt at Cherry Hill has given a very good return for the year, four parties having been upon very rich ground. It is, however, extremely doubtful if the best of the ground has not been worked, and consequently the results for the coming year may not be so good as for the last. There is undoubtedly a good run of gold in the locality, and there is every probability that for many years hence payable gold will be found, the impossibility of ascertaining the exact depth of the ground before commencing operations being the only serious difficulty in prospecting.

The Barra Sluicing Company has extended the area of its holding and made arrangements for the erection of a large plant which it is expected will enable 9 acres per annum to be treated. During the year 1901 the Company treated some 50,000 cubic yards of material for a return of 403 oz. of gold, valued at £1,392, and 2 tons of tin ore valued at £180.

Quartz-mining has become practically non-existent, only two leases being in force, and even these have not been worked.

Although the number of miners employed was greater than in the previous year, the gold won has not increased in the same proportion. The estimated total yield for the year was 2,903 oz., valued at £10,892.

Tooma Division.

Mining in this Division is almost at a standstill. The only reef being worked is at Ournie, the yield therefrom being represented by 34 oz., valued at £114, which was obtained from 22 tons of stone.

A limited number of fossickers have found employment at the Toolong diggings, the value of the gold won being estimated at £2,000.

Cooma Division.

Quartz-mining in this Division has been very dull during the year.

The mines at Bushy Hill were under suspension of the labour conditions for the greater part of the year. Several of the holdings have recently come under the one management, and a concentrating plant is being erected. The ore is very pyritic, and is, therefore, not amenable to ordinary battery treatment, while heavy water is also met with. It is only by the amalgamation of the leases and the introduction of sufficient capital to provide the necessary plant to treat the ore locally and to cope with the water that these mines can possibly be made to pay. It is to be hoped that the interest which is again being evinced in the mines will result in their being placed on a proper basis.

A large amount of prospecting work has been done at Cowra Creek during the year, and numerous grants have been made from the Prospecting Vote with the object of proving the value of the reefs at a depth. It is reported that the results obtained are so favourable that a large amount of capital is likely to be forthcoming to prosecute further work and fully develop the locality.

Several men have been occupied fossicking, chiefly on the banks and in the beds of the Umaralla and Snowy Rivers, and they obtained fairly satisfactory returns.

The gold yield of this Division for the year was 1,890 oz., valued at £6,825.

Kiandra Division.

An examination of the Kiandra Gold-field has been made by Mr. Geological Surveyor Andrews, and his report, together with a geological map, is in course of publication, and will be available before the issue of this volume. About 500 acres have been applied for as gold leases with the object of testing the deep leads under the basalt; and in view of Mr. Andrews' report it is anticipated that active operations will shortly be started, and that this field will once again support a numerous and thriving mining population.

Sluicing operations at the Empress Mine were only carried out for a period of twelve weeks during the year, as, owing to the drought, the water supply failed. The yield obtained was 375 oz., valued at £1,400, and Mr. Lette, the owner, states that every fathom of wash blocked out returns a net profit of £4 5s.

Operations at the New Cham Mine were also retarded for want of water, and work was suspended from the end of February to the middle of August.

The mine held by Mr. Johnston, at Bogong, has been under suspension for the greater part of the year.

A number of miners and fossickers are engaged searching for alluvial throughout the district with satisfactory results.

The quantity of gold won in this Division during the year, including that obtained by the Kiandra Gold-dredging Company, was 2,989 oz., valued at £10,993.

Captain's Flat Division.

Mining of all kinds has been absolutely lifeless during the past year, and there has been no gold won in this Division.

The Lake George Mines Company has held suspension of the labour conditions on both its gold and mineral leases, and with the exception of a few men who were employed in October and November, no work of any kind was done. During the months referred to, about twenty men were employed prospecting the gossan ores and taking samples, which were sent to England to be experimented on by the "oil" treatment. Should these experiments prove satisfactory, it is the intention of the Company to erect an "oil" plant on an extensive scale and to work the gossan lode.

The old Lake George Company went into liquidation, but a new company was formed, with a capital of 180,000 shares at £1 each, all the scrip being fully subscribed. At present there is no information available from which to draw conclusions, and developments which should have an important bearing on the future of Captain's Flat are anxiously awaited.

Bungendore Division.

Gold-mining in this Division is confined to the prospecting of a few quartz reefs at Bywong, but the results obtained have been anything but satisfactory.

Gundaroo Division.

During the year there was only one quartz claim registered, and this, after being worked for about three months, was abandoned. The quantity of stone treated was 2½ tons for a yield of 3 oz. 3 dwts., valued at £12 15s.

There are now only a few miners engaged in this Division. These are all fossickers and work along the banks or in the bed of Brook's Creek, and the estimated quantity of gold won is 40 oz., valued at £155. There is a marked decrease in the return of gold in this Division for the years 1900 and 1901 as compared with previous years, and this is accounted for by the fact that there has been no reef mining, while the greater portion of gold won in former years was from this source.

Yass Division.

Very little mining of importance was in progress on any of the reefs in this Division during the year. Some work was done at Nanima, and several crushings were put through by Mr. R. Young, but there is nothing of any consequence to record.

The alluvial workings which are situated at Spring Range, about 40 miles from Yass, have, during the past year, employed about thirteen men intermittently, some 4,600 loads of wash being treated for a return of 218 oz. of gold, valued at £835 10s.

The ground worked covers an area of about 40 acres, the wash being from 1 inch to 18 inches in thickness at a depth of from 1 foot to 4 feet. The gold is won by puddling, there being three machines on the area, and owing to scarcity of water the work has been spasmodic.

The total yield of this Division for the year is estimated as 504 oz., valued at £1,925.

HUNTER

HUNTER AND MACLEAY MINING DISTRICT.

Dungog Division.

There were no important developments during the year in this Division.

The Wonga Wonga Mine was taken over by a company in August last. The mine is now being opened up at a low level, and encouraging prospects have been met with. The Company is erecting a cyanide plant and an additional five head of stampers.

There are several other parties working, but operations have been confined principally to prospecting.

The total yield from this Division for the year is estimated at 209 oz., valued at £741.

Copeland Division.

Very little progress has been made in mining during the year in this Division. The total amount of stone and mullock crushed was about 393 tons, for a total yield of 105 oz. 12 dwts.

The Hidden Treasure Mine has been worked by a party of tributers, who have been taking out stone from the higher levels, but the results have not been satisfactory.

The Prince Charlie Mine was idle for over twelve months, but a party of miners have now started to continue the tunnel previously driven 675 feet, and are in receipt of prospecting aid for this work.

At the Bowman, Mr. Norman Grant has had from two to six men working in the Mint Mine driving a deep-level tunnel, and is also receiving prospecting aid. No stone was crushed during the year.

At Boranel, near Cobark, Mitchell and party are continuing a shaft from the 80-foot level, also with Government assistance. Only 10 tons of stone were crushed during the year, which yielded 16 oz. of gold.

At Kerriput, A. G. Cooper has been prospecting a reef which has, as yet, not proved payable.

The Gloucester River Mine is still being worked by Mr. Wm. Fisher, but no stone was crushed during the year.

A few fossickers have been working during the year with but poor results, the abnormally small rainfall having greatly impeded operations.

Bulladelah Division.

Gold-mining in this Division during the year has been limited to prospecting for reefs, and there is nothing of interest to record.

Taree Division.

Work of a desultory nature was carried out on several leases on the Cells Field during the year, but no returns as to the results of operations are to hand, and there appears to be no immediate likelihood of any revival in gold-mining occurring at this place.

PEEL AND URALLA MINING DISTRICT.

Kookabookra Division.

There has been a big decrease in the number of men engaged in alluvial mining in this Division during the year.

The old gullies and river beds are becoming exhausted, and most of the ground has been worked over and over again, while no new alluvial finds have been discovered.

Quartz-mining has remained a dead letter during the year, and until capital be forthcoming no improvement can be looked for.

About ninety miners, Europeans and Chinese, were employed fossicking about the old workings at Oban, Mitchell's River, Paddy's Gully, and Nowland's Creek. They obtained about 170 oz. of gold and 2 tons of tin ore.

Armistide Division.

There are four gold leases in force in this Division, but beyond prospecting, very little work of a profitable nature has been done thereon. The yield for the year is estimated as 120 oz., valued at £455.

Nowendoc Division.

Mining has practically ceased in this Division, there being only a few men engaged fossicking, and they are unable to make a living.

Hillgrove Division.

During the early portion of the year mining was dull, but thereafter an improvement was manifested. A considerable amount of prospecting was carried out during the year, much of it under aid granted by the Prospecting Board, and some promising discoveries have been made.

At the Baker's Creek Mine further sinking and driving from the lower level has been in progress. This company, during the early part of the year, bought the property of the Consols Gold-mining Company, and has been altering the machinery and plant of the latter mine, to enable the Baker's Creek Mine to be worked to better advantage. The value of the machinery on the mine is estimated to be £13,843. The ore raised during the year amounted to 12,442 tons of quartz, and yielded 11,004 oz. 8 dwts. of gold, valued at £36,803 3s. 175 tons of concentrates were also obtained, which returned 620 oz. 7 dwts. of gold, valued at £2,481 8s., making the total value of the production for the year, £39,284 11s. The yield from this mine during the last five years is as follows:—1897, 13,044 oz.; 1898, 10,039 oz.; 1899, 13,098 oz.; 1900, 9,059 oz.; 1901, 11,624 oz.

The Eleanora Mine has been worked solely on tribute, during the year—that is, as regards the underground works. The Company has been engaged treating tailings on the surface by a method of concentration, and was, at the close of the year, extending the plant with the object of treating these tailings in a more extensive way. The quantity of tailings stacked on the mine is, approximately, 100,000 tons. The value of the metal obtained from all sources was £8,004.

The work carried out by the Hillgrove Proprietary Company during the past year has been confined to testing the value of what is known as the Baker's Creek Little Reef, in its property adjoining the Baker's Creek Company. The main shaft was sunk a further depth of 278 feet, making a total of 661 feet below the level of the Cooney tunnel. The shaft has been timbered a further depth of 279 feet, making a total depth timbered of 651 feet. Two crosscuts were driven from the shaft—No. 2, at the 445-foot level, and No. 1 at 545-foot level,—and the reef located in each. No. 4 crosscut, at 645-foot level, has been started, and should shortly intersect the reef. This company has done excellent work, and the opinion is held by many experienced miners and managers that this mine will be a second Baker's Creek.

Operations at the Garibaldi Gold and Antimony Mine has been confined to prospecting, &c., and the Company obtained suspension of the labour conditions during the last period of the year.

The Cosmopolitan Gold-mining Company has been sinking and driving during the past year. 63 tons of quartz were crushed, which yielded 71 oz. 11 dwts. of gold, of the value of £255.

The New Zealand Mines Trust has been engaged in following a poor but well-defined quartz vein on the property known as the Phoenix Mine.

Henry Collins and party (known as the Hillgrove Prospecting Syndicate), at Four-mile Creek, have been driving and following the reef, with assistance from the Prospecting Vote. The country is very hard, and progress is consequently slow.

As previously mentioned, there are a number of miners engaged prospecting, but no definite opinion can be formed as to the results likely to be obtained, but present indications give every promise of success.

The total gold yield for the year is estimated as 13,591 oz., valued at £46,965.

Metz Division.

The mines in this Division have been shut down for the greater part, if not the whole, of the year, and, as a consequence, there is a great falling off in the gold yield.

Operations at the Sunlight Mine ceased in the month of April, and only a few surface hands were employed from that date to the end of the year. The Company has, however, since commenced work, and contracts have been let and arrangements made with the freeholders of the property to reduce the royalty paid to them, thus giving the Company a better chance to pay its way.

At the West Sunlight Mine nothing has been done during the year. The mine was sold to Mr. Edward McNamara, who has commenced treating the tailings, half of which he disposed of to Mr. Sebille, of Victoria, who has already started to erect a cyanide plant to treat them. Should he be successful, it will be of very great importance to this field. Hitherto, owing to the large amount of antimony contained in the ore, all attempts to treat the tailings have been unsuccessful. No work is being done in the mine, but the proprietor hopes to let it on tribute.

The Hopetoun Mine, after being idle for several years, has been floated into a company, which, being satisfied with the prospects, is erecting a ten-head battery. This plant will be completed early in the current year. There are other reefs in the locality of the Hopetoun Mine, and, with a battery at hand, the development of same will no doubt be greatly encouraged.

The Starlight Mine is still the subject of litigation, and no work has been done thereon.

With the Hopetoun Mine starting operations, and the Sunlight and West Sunlight Mines also working, the future prospects of this field are much more encouraging. The quantity of stone treated for the year was 4,165 tons, and also 6 tons of concentrates, which yielded 1,158 oz. of gold, valued at £4,695.

Uralla Division.

Owing to the scarcity of water, it has not been possible to carry on sluicing operations continuously, and consequently there is a great falling off in the gold yield from this source. The amount of gold obtained, other than by dredging, during the year, is estimated at 892 oz., valued at £3,457.

Walcha Division.

Prospecting has been carried on in this Division by several parties with but little success, and no gold is reported as having been won during the year.

Swamp Oak Division.

Mining in the early part of the year at Swamp Oak was exceptionally dull, caused principally by the company which was working the "Highland Mary Claim" disposing of the property, and discharging all hands. Several mining tenements have since been applied for and worked, the applicants being assisted with aid from the Prospecting Vote.

Very little work is being done at Niangala—in fact, since the removal of the plant by the New South Wales Gold Fields Company, work has been at a standstill. A party of six men are engaged sinking on the reef known as the "Golden Spin."

At Glen Morrison a few miners are at work. Farrell and party have obtained some very good stone from a leader, which was crushed at Swamp Oak for a satisfactory return.

McMahon and party are the only miners working and raising stone at Camp Fire. The reef is very promising, and prospects dollied from 4 dwts. to 2 oz. to the ton.

No work has been done on the neglected field known as Paradise during the year. McLennan and party are engaged driving a tunnel for 200 feet into a basalt mountain about 6 miles south of Paradise, near Lever Creek, for alluvial, which, if found, would open up a very large field, as there is an extent of promising country running in the direction of the Hanging Rock.

Tamworth Division.

Mining in all its branches has continued in a depressed state during the year. New finds of gold in quartz at Attunga have been reported, the discovery being upon private lands. Although several claims were taken up, only two are being worked, and but little has been done either to show their permanency or a profitable result. The surface indication is decidedly a good one, and worthy of being thoroughly tested to a depth.

Nundle Division.

The yield for this Division shows a slight increase over that of the previous year. At the Tamworth Gold-mine the shaft has been sunk a further depth of 50 feet on the course of the lode, which varies from a few inches to 3 feet in width, and is not payable. Work was partially suspended for three months of the year through an influx of water. The quantity of quartz crushed was 428 tons for a yield of 120 oz. At this Company's battery 100 tons were crushed for other mine owners.

Work at Gazley and Murray's Excelsior Mine has been chiefly prospecting. Operations have been greatly interfered with and impeded by the influx of water. Good stone is being raised, which shows gold freely. The quantity of quartz crushed was 158 tons yielding 140 oz.

Jarvey and party, at the Duke of York Mine, Foley's Folly, are on a reef supposed to be the continuation of the old Folly line. The reef is about 2 feet wide and carries fair gold, both free and in pyrites. The stone has averaged as high as 7 oz. to the ton. The party have a drive in on the reef about 300 feet and a shaft about 70 feet, and have won 74 oz. from 28 tons of stone. The last crushing at Wilkins' battery, Bowling Alley Point, realised 14 oz. from 5 tons of stone—a very satisfactory return.

At Wright's property, Quacka Nackie, 40 tons were crushed for a yield of 30 oz., and a lode of decomposed slate carrying good gold is now being worked.

Paull and party at the White Rose Mine, originally held by Bouchier & Co., have taken out 55 tons of quartz, which yielded 230 oz.

Rackham and party are still working the old Lady Mary reef, and they have a tunnel on the reef about 600 feet.

Wolfenden and Ryan are putting a tunnel from Spring Creek into the hill to try and cut the reef and have received aid from the Prospecting Vote to assist them in their search.

Henry and party are putting in a drive to cut the chute of gold at a low level, the tunnel is in about 25 feet, and they expect to cut the reef in about another 50 feet.

Graham and Wade are working a promising looking reef at Spring Gully, which is about 2 feet wide and carries good gold; their tunnel is in about 40 feet.

J. Brayshaw is working the old cement lead at Harden's Hill and making good wages.

Fogarty and party have a tunnel between 600 and 700 feet in the cement at Red Hill and are blocking out payable ground; the face is about 70 feet wide and still widening. They hope to cut the main deep channel in about another 100 feet. The ground is dipping into the hill for about the last 200 feet, and so far no rock has been met with. An air shaft has been put down about 200 feet from the mouth of the tunnel. These workings are in close proximity to the once famous Mount Shelia Mine which has been abandoned for some time.

The Daylight Mine, 2 miles south of Bowling Alley Point, owned by Jensen and party, has been worked with satisfactory results.

Fouraere and party at Two-grain Flat have also had payable results.

Collett and McEwan are sinking a prospecting shaft at Mount Pleasant to try and pick up the lead from Mount Misery. The shaft is down about 170 feet, passing through good country. They expect to bottom at about 300 feet.

Isaacsohn and Fallon, at Mount Ephraim, have done very little throughout the year on account of scarcity of water, the total value of gold won being about £70.

A report on the Nundle District by Mr. Geological Surveyor Jaquet appears in the Appendix to this volume.

Bendemeer Division.

There are a few fossickers engaged in this Division, who apparently are not able to even earn tucker at this work, and the results are very unpromising.

Moonan Brook Division.

Quartz-mining in this Division is principally confined to prospecting, and a considerable amount of money has been allotted from the Prospecting Vote to numerous sites.

The result of the assistance granted to drive under the basalt at Dry Creek is being awaited with much interest.

During the year a concentrating plant has been erected at Moonan Brook in connection with the battery, but the proprietors state that it is not giving satisfaction.

A considerable quantity of quartz from all parts of the district has been treated at the Cockle Creek Works, and in some instances 6 oz. per ton have been returned.

The alluvial diggings are without improvement, and miners say they make a living, but nothing more.

During the year 326 tons of quartz, yielding 422 oz. of gold were raised; also 400 loads of alluvial, yielding 49 oz. of gold, the total value of the gold won being £1,679.

Stewart's

Stewart's Brook Division.

The New Royal Standard Gold-mine is the principal holding in the Division, and has been the mainstay of the field for some years. The past year has, however, proved unsatisfactory, the stone raised not paying expenses. Prospecting has been actively carried out on the Standard and Mountaineer line of reefs. Attention has also been given to a third reef, known as the Dixon, a long drive being put in, and the reef cut, the prospects from which are regarded as very satisfactory.

The New Imperial Standard Gold-mining Company, which, before reconstruction, carried on operations under the title of the Imperial Standard Gold-mining Company, commenced the cutting down and timbering of the shaft in August last, preparatory to the erection of a winding plant to facilitate the testing of the reef below the 220-foot level.

The Lady Grace Company has done a lot of work in its mine during the year, but with indifferent results. The No. 2 tunnel has been extended about 280 feet on the reef, but it is considered that it will have to be driven another 100 feet before the rich shoot of gold proved in No. 1 tunnel can be cut.

No work has been done by the Stewart's Brook Company during the past year, and all the leases have been cancelled.

Ninness' Mine, known as Cook's Patch, is still receiving assistance from the Prospecting Vote, but the gold is shown to be very patchy, and the results obtained during the year were unpromising.

R. H. Carter's Mine on private property has not been payable. The stone raised is poor, and the mine cannot be worked to advantage, owing to the inrush of water.

Much prospecting work has been done on the field, but in no instance have the prospectors found stone sufficiently good to put through the battery.

The estimated quantity of quartz raised during the year is 503 tons, yielding 397 oz. 10 dwts. of gold, valued at £1,358.

Barraba Division.

Gold-mining in this Division shows a slight improvement on the previous year.

At Crow Mountain, Ti-tree, and Wood's Reef a few miners find employment. Most of these men are fossicking and prospecting, the total quantity of gold won being 234 oz., valued at about £915, as against 160 oz., valued at £640, for the year 1900.

Bingara Division.

Very little in the way of gold mining has been done during the year, about the only mine that has been working being Messrs. Miller and Finkernagel's, at Barrack Creek, near Top Bingara. This party crushed about 200 tons for a yield of 125 oz. of gold, valued at £280, which did not pay working expenses.

At Top Bingara and Spring Creek there is the usual amount of fossicking, but work is not being as vigorously carried on as in former years, owing to the fact that a great number of the fossickers are in receipt of old-age pensions.

At Bobby Whitlow there are several fossickers, but they have done nothing since the winter, as it has been well-nigh impossible to get water even for domestic purposes.

NEW ENGLAND MINING DISTRICT.

Drake Division.

The yield of the various metals for the year 1901 has exceeded in value the product of the previous year by several thousands of pounds, and the development of the mines during this period has revealed the fact that there are large and rich deposits of mineral in the district. This knowledge has firmly established confidence in the permanence and value of the field.

The success of the past year's operations has been due in a large measure to the favourable price ruling for copper, that metal being one of the chief products of this field. The establishment of the Sulphide Works at Cockle Creek has also been a great auxiliary in promoting and encouraging the mining industry throughout the district. Were it not for such works being available to deal with our refractory ores, this field would have been abandoned long since, as beyond a certain depth the gold is found in combination with copper, silver, and various base metals, and scientific treatment is needed to extract and separate the profitable metals.

The returns from alluvial workings this year are very small. This shortage is due to the extremely dry season, and to the fact of there being no water available for sluicing purposes.

On the whole, the prospects of mining throughout the district at present are more encouraging than they have been for some time, for the reason that the erection of smelting works on the field is contemplated; in fact, the construction of them has been commenced, and there is now a possibility of all the low-grade ores on the field being dealt with locally. There are also extensive concentration works in course of erection for the public convenience, which will give the miners the advantage of having their ores classed up to a better marketable condition than can be obtained by the most careful hand-dressing.

At the Pioneer Mine, which is situated on the crown of Mount Carrington, overlooking the village of Drake, sixteen men have been continuously employed during the year, and a good deal of exploratory work has been performed. No. 1 shaft has been sunk to a further depth of 50 feet from the 185-foot level, thus making the total depth 235 feet. At a point 10 feet below the 185-foot level the lode pinched out to a thread, and continued so to the bottom of the shaft. As it did not increase in size as depth was attained, the manager decided to discontinue the sinking, and he took an underhand stope north and south from the 185-foot level. These stopes are now almost down to the bottom of the shaft, and the most important feature in connection with this work is that the reef or lode has improved on each side of the shaft, and now varies in size from 6 to 18 inches in width, and assays 3 oz. of gold per ton and 4 per cent. of copper. Stopping has now been suspended, with a view to the resumption of the sinking of the shaft, as the manager is of opinion that a large and probably rich deposit of mineral will be revealed as depth is attained. As this shaft is now down beyond the limit of a whip, more powerful winding gear will be erected, and the sinking of this shaft will be proceeded with forthwith. In No. 3 shaft, below the 145-foot level, at a point distant 80 feet north from the shaft, a winze has been sunk 27 feet, exposing a reef 18 inches wide, which assays 1 oz. of gold per ton and 3 per cent. of copper. From the bottom of this winze a drive has been put in north a distance of 50 feet, to connect the workings with No. 1 shaft. This drive exposes a reef 1 foot wide, which assays 10 dwts. of gold to the ton and 2½ per cent. of copper. The connection of this drive with the workings in No. 1 shaft gives better ventilation and greater facilities for the working of the mine. In Gold Lease 101, which is one of the blocks held by the Pioneer Company, the low-level tunnel at the base of the mountain on the southern side of Mount Carrington has been advanced 100 feet during the year. At a point 150 feet from the entrance of this tunnel the Pioneer lode was intersected, showing a reef 4 feet wide, assaying 1 dwt. of gold per ton and 4 per cent. of copper. This tunnel was continued along the lode for a distance of 50 feet, but the ore not being rich enough to send to Cockle Creek for treatment, operations in this block were suspended pending the erection of concentration works, on the completion of which work will be resumed in this part of the mine. During the year this mine produced 136 tons 8 cwt. 1 qr. 12 lb. of ore, which were sold to the Sulphide Corporation at Cockle Creek, and realised, the sum of £1,737 0s. 8d., as follows:—4 tons of copper of the value of £253 1s.; 370 oz. 12 dwts. of gold, worth £1,482 11s. 6d.; and 12 oz. 10 dwts. of silver, of the value of £1 8s. 2d. To obtain this quantity of marketable mineral it was found necessary to discard about 100 tons of ore which were too poor to forward to distant metallurgical works, although containing more than 11 dwts. of gold to the ton, and 2½ per cent. copper. This, with the quantity stacked on the floors previously, brings the parcel of low grade ore which is reserved for local treatment when appliances are available, up to 300 tons or more. Captain Crabb, the manager, states that he has purchased a share in the old Mount Carrington Battery, and is about to erect concentrating machinery in connection therewith for the express purpose of dealing with the low-grade ores in the Pioneer Mine, and is now having all the machinery put in going order. At considerable expense, the Mount Carrington dam has been put in a thorough state of repair. The reservoir has now a capacity of 4,778,000 gallons of water, with an excellent catchment for all storm-water from the adjacent slopes. Mr. Crabb is also erecting an aerial tramway, 1,700 feet in length, to carry the ores from the summit of Mount Carrington to the mill at the foot of the mountain. The quantity of land held under lease by the Pioneer Co. embraces an area of 15 acres.

In the Sawpit Gully Gold and Silver Mining Co.'s mine, 2 miles north of Drake, the past year's explorations have revealed an extensive auriferous and argentiferous formation at the 100-foot level. The output of this mine, however, for the past year did not come up to the expectations formed at the end of the previous year, owing to the fact that in the earlier months of the year a good deal of time was occupied in erecting poppet-heads, placing winding machinery in position, and also erecting air-compressing machinery. For two months the crushing-mill operated on ore from the 100-foot level in block G.L. 69, on which the principal workings are situated. The ore, after leaving the battery, was concentrated on Frue vanners, and the tailings cyanided. The concentrates were sold to the Sulphide Corporation at Cockle Creek. The cyaniding, Mr. Edgar Hall, the managing director, states, was not at first successful, but, as experience was gained, the work became more satisfactory. The cyanide bullion was sold for 4s. 2½d. per oz. The total value of the metal contents extracted, while the work proceeded properly, was 21s. per ton of ore. The total expense in connection with the treatment did not exceed 19s. per ton, of which 5s. per ton was for the realisation of concentrates. It is proposed in future to treat the concentrates on the mine by smelting, and for this purpose a calcining furnace and a reverberatory smelting furnace are to be erected, whereby a saving of 3s. per ton of ore will, it is alleged, be effected. The lode at the 100-foot level of this mine was taken out for a length of 105 feet, by a width of 23 feet. The ore continues of the same value at the ends of the drives, and shows an improvement at the east end; and the mine gives promise of yielding a large supply of ore quite up to the standard. New cyanide vats are being erected, and a few minor improvements made before work is recommenced. It is expected in future to mine and treat the ore from this mine at a cost of 14s. per ton, which should give a profit of 10s. per ton. The area of land held by the Sawpit Gully Gold and Silver Mining Co., inclusive of dam sites, machine area, and gold and mineral leases, is 49 acres; and the average number of men employed during the year was sixteen. The value of machinery and plant is estimated at £10,600. The total quantity of ore raised during the year was 1,200 tons, the assay value of which was 12½ oz. of silver and 3 dwts. of gold per ton, representing a total value of £2,345, the metal contents being 15,000 oz. of silver, valued at £1,625, and 180 oz. of gold of the value of £720. From present indications, it would seem that a very large number of hands will find employment in this mine, and there will also be a considerable increase in the output of mineral, and the extraction of metal, during the current year.

The Adeline Mine, which is the next in importance on the field, is held by the Adeline Syndicate, Limited, and gives promise of being a large mineral-producing property, and a source of considerable wealth in the near future. This Syndicate holds an area of 51 acres of land, inclusive of a mineral lease of 36 acres, and a gold lease of 4 acres on Crown land, and 11 acres on private land. From fifteen to twenty men have been continuously employed during the greater part of the year. The ore contents consists principally of copper, and at various points a large percentage of gold, which is found in combination with the copper. The lode at the 100-foot level varies in width from 3 to 5 feet, and has been proved along the line of lode for a distance of 8 chains. During the interval, from February to June, 1901, concentration tests were made with the sulphide ore from the 100-foot level. A Willey table, with slime-boxes, were used, but after running for a short time the loss in copper was found to be 50 per cent., and gold about 17½ per cent. 574 tons of ore were raised, of which, after tests were made, 153 tons were rejected as being too ferruginous; the remaining 421 tons were treated at the Adeline Mill, yielding 94.47 tons of concentrates, which contained 93.1 oz. of gold and 10.26 tons of copper. Owing to the great losses, concentration was not continued. Several tribute parties have been working in different parts of the mine during the year. One of the tribute parties in the northern end of the workings raised 46.9 tons of ore of first quality, containing 19 oz. of gold, and 7.33 tons of copper. At the south end of the mine, Messrs. Bray and party have been raising ore of a very superior quality, and from the 7th October to the 31st December have raised 87 tons of mineral, which yielded 438 oz. of gold, and 5.7 tons of copper. A large quantity of valuable seconds from both tribute parties is lying on the surface. The total quantity of ore raised from this mine during the year was 702 tons, containing 41 tons of copper, of the value of £2,460, and 601 oz. of gold, of the value of £2,404, the aggregate value of all metals being £4,864. The value of machinery on this mine is £2,000.

At the Mascotte Mine, which is situated 2 miles in a south-easterly direction from the township of Drake, a party of four men hold a block of 4 acres of land as a gold-mining lease, on which they have been working for the last two years with very satisfactory results. They are, at present, operating on a lode formation at the 50-foot level, 12 feet wide, which carries a large percentage of gold and silver, and occasionally extremely rich bunches or pockets of mineral are met with. During the past year this party have raised and sold 83 tons of ore to the Sulphide Corporation at Cockle Creek, which yielded 5,105 oz. of silver, of the value of £585, and 112 oz. of gold, valued at £448, or a total value of £1,033. The value of the ore obtained in this mine averages £12 9s. per ton.

At the Rainbow Mine, Mount Carrington, which is held as a gold lease by Messrs. Parker and O'Connor, a good deal of progressive work has been performed during the past year. The principal operations have been confined to the south end of the mine. They have driven 50 feet south from the 90-foot level, or bottom of No 2 shaft, and extended the drive at the 40-foot level a further distance of 40 feet south, and stopped up to the surface. No work has been done in the north end of the mine during the year. The most northern or No. 1 shaft is down to a depth of 140 feet from the surface, and the lode from the surface to the lower level averages 18 inches in width, whilst at the bottom of the shaft it is over two feet wide, and the ore body at that depth assays 8 per cent. copper and 1 oz. 15 dwts. of gold per ton. There is estimated to be in sight about 800 tons of ore to be taken out, the value of which, according to the price of copper at date, and allowing for the gold contents, is £8 per ton. The quantity of ore obtained from this mine during the past year, and sold on assay value to the Sulphide Corporation, was 47 tons 3 cwt. 2 qr. 9 lb., which contained 148 oz. of gold, of the value of £592, and a small percentage of copper.

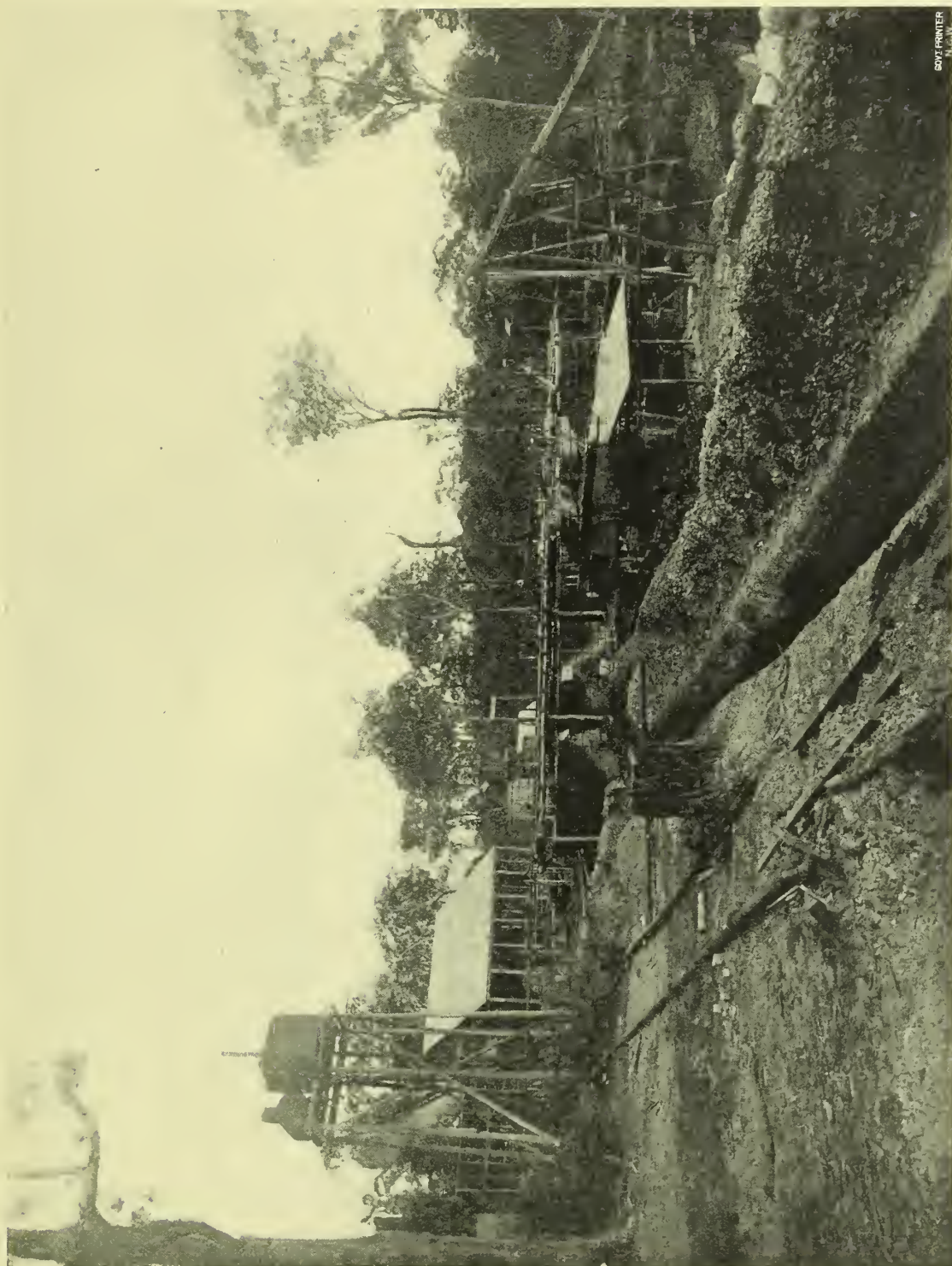
At the Lady Mary Mine, on the northern slope of Mount Carrington, very satisfactory results have been obtained by the proprietors—Messrs. Hawkins and Tubman. The area of land held by this party is a gold-mining lease of 5 acres. There are four shafts sunk on the line of lode to a depth of 70, 75, 80, and 135 feet, respectively, each of them being connected by drives. The principal operations have been confined to the northern end of the mine during the year. The mineral formation on this line of lode is about 3 feet wide generally, but the bulk of the lode is too poor to send to a distant market, and only the rich ore has been taken out and sold to the Sulphide Corporation at a fair market value. During the year 59 tons of mineral have been won from this mine and sold on assay value, yielding copper of the value of £320, and 9 oz. 5 dwts. of gold of the value of £31 8s.

The Lady Mary Extended is another mine which has come into prominence during the year. It is owned by McCrossin and party, and comprises an area of 6 acres of land, situated south of the Lady Mary, and apparently on the same line of lode as the Lady Mary. During the year, 86 tons 15 cwt. 3 qr. 27 lb. of ore (copper glance) have been raised and sold on assay value for copper to the Sulphide Corporation at Cockle Creek for £917 12s. 11d. The deepest level at which operations have been carried on is 150 feet from the surface, and the lode formation varies from 15 to 20 feet in width. The greater part of this large body of mineral is not rich enough to send to Cockle Creek, and is stacked on the surface for future treatment when reduction works are available. Only the richest veins have been picked out and sold.

Donkin and McAulay's Mine, on the north boundary of the Lady Mary, and on the same line of lode, is a 2-acre block, known as G.L. 80. On this block four men have been continuously employed during the year, and they have raised and sold 84 tons 13 cwt. 3 qr. of ore to the Sulphide Corporation, which realised £1,060 4s. 11d. In this mine, also, only the richest ore has been selected for market.

R. B. Clarke and party, who hold a mineral lease of 40 acres near Mount Carrington, have been operating on some surface veins of copper, and have been doing a great deal of prospecting during the year by shafts and open cuts along the line for a distance of 10 chains, but the last year's operations by this party have not been productive of anything like satisfactory results; only 20 tons of ore have been obtained of the value of £200. For a couple of years past this mine was a large producer of mineral, and was worked in some parts of the lode to a depth of 65 feet, at which depth the influx of water was too great to contend with. The ore on this line of lode occurs in bunches, and some places have been very rich in copper. Gold and silver have also been found near the surface in small quantities. Six men have been employed on this mine during the greater part of the year.

The "Lone Hand" is a 2-acre block, owned by Messrs. Parker and Rasmussen, on the southern slope of Mount Carrington, and is worked exclusively as a gold-mine, the ore being sold on assay value. This mine, during the last four years, has produced a large quantity of gold. The last year's returns, however, show a decrease on the yield of the previous year, only £180 worth of gold having been obtained.



THE SAWPIT GULLY GOLD AND SILVER MINING COMPANY, DRAKE (BATTERY AND CYANIDE WORKS).

GOVT PRINTER
1914

At Lunatic Reefs, Messrs. Bell and Wheeler have been for the last twelve months prospecting in the Golden Crown Mine, which is held as an ordinary quartz claim under the Mining Board Regulations. At a depth of 130 feet from the surface, they have been operating on a vein of quartz varying from 2 to 12 inches in width, in black slate country, carrying coarse gold. A large quantity of antimony and metallic arsenic is found in this lode, and the ore, when roasted and concentrated, yields an assay of 3 oz. 15 dwt. of gold to the ton. 9 tons 7 cwt. of stone has been obtained from this vein, and when crushed yielded 36 oz. 11 dwt. of gold, valued at £131 8s. 2d.

On the Lunatic line of reef, in the same locality, Messrs. Wall and party have done a considerable amount of development, but have not yet met with anything of a payable nature.

At Frazer's Gully, near Tooloom, Messrs. Howling Brothers have been operating on a small gold-bearing reef (in an altered slate) varying from 1 to 6 inches wide. They have driven along the line a distance of 600 feet, and have proved it to be gold-bearing all that distance. Two shafts have been sunk on the line to a depth of 45 and 50 feet respectively. The gold seems to be equally distributed throughout the stone as far as it has been opened up. They have obtained during the year 27 tons of stone, which yielded 71 oz. 8 dwt. of gold, of the value of £267.

The Lady Jersey Mine, at Long Gully, has not had a very prosperous year, and work has only been carried on spasmodically. Twelve men are employed on this mine, and they have raised and crushed 455 tons of stone, for a yield of 343 oz. 13 dwt. of gold, of the value of £822.

Some excitement was occasioned by the reported discovery of rich stone, by Messrs. McDonald and party, at Kimorley, on the eastern bank of the Cataract River, about 11 miles west of Drake, but the reports appear to have been somewhat highly coloured. A number of gold-mining leases have been applied for in the neighbourhood, and a fair population was attracted to the field. The nature of the strata traversed by the reef is porphyry, diorite, and altered slate, which carry a network of veins which may prove payable at a depth.

The principal sources of alluvial gold in this division are Poverty Point, McLeod's Creek, Tooloom, and Pretty Gully. At Poverty Point the average earnings during the year have been £2 per week. A good deal of new ground has been opened recently, and although it is poor there is no doubt it will maintain a small population of miners for some years to come. At Pretty Gully and Tooloom, when water is plentiful, there is a living to be made in the old creeks and gullies in that neighbourhood.

At Lionsville mining matters are rather quiet. One party of miners has taken up the old "Lion" reef, and is driving a tunnel from the southern side of the hill, with a view to intersect the old workings at a point where it is said gold was left by the original owners of this mine. Tamini and party have put a cross-cut into the old workings of the Lombardy reef, and have met with some nice patches of gold. Bassetti and party, on the Solferino Reef, have taken out a large quantity of stone during the year; but on account of the scarcity of water no crushing has been done.

All the alluvial workings around Lionsville and Solferino are almost deserted. A few men, however, find employment at the Bulldog diggings and Ewengar scrub. In these places in wet seasons, when water is plentiful for sluicing purposes, fairly good wages can be made.

The yield of the various minerals for the year has been satisfactory, the total value being £18,706 13s., an increase of £6,501 8s. on the previous year's return.

The population of the town of Drake is about the same as the previous year, viz., about 700.

Tenterfield Division.

The only operations which have been carried on at Boonoo Boonoo have been those of Bell, Booth and party, and Stephenson and party on the Buck Reef at Specimen Gully, and work has been confined to prospecting and opening up the reef.

There are several men working on the old alluvial diggings at Boonoo Boonoo, and between them they succeeded in recovering 56 oz. of gold, worth £191.

At the Five Bull one party obtained 14 oz. of gold, valued at £63, from an alluvial claim.

The want of sufficient capital to more fully develop the various known reefs seems to be the great drawback to the mining industry upon this field.

Wilson's Downfall Division.

A little prospecting has been going on in Cullen's Creek and about the Rivertree Ranges.

Gold has been found in wash-dirt and small quartz leaders, but not in sufficient quantity to pay for working. The prospectors, however, are very hopeful, and will continue in their search.

CLARENCE AND RICHMOND MINING DISTRICT.

Grafton Division.

Beyond a little prospecting, no quartz mining has been done in this Division during the year.

A few men were employed at the alluvial workings at Yantalla Creek for about six months, but their work has been confined to stripping and getting out wash-dirt when rain falls.

Coramba Division.

Mining has not been so brisk in this Division as in the previous year.

At Upper Orara two men have been working for a length of time, and from their prospecting protection area they have procured 45 tons of stone, which yielded 32 oz., valued at £112. About the locality reefs are known to abound, but it is of little, if any, use for struggling miners to attempt the work of opening them up, as at a depth of 70 feet or so the water becomes troublesome, and work must perforce cease.

Mining at Lower Bucca is similar to the other mining centres; there are a few workers, but their prospects are, they consider, the reverse of bright. David Pont has a 1-acre gold lease, but is unable to cope with the constant influx of water.

The Blue Mystery mine, upon which large sums of money have been expended, and from which good quantities of gold were obtained, is now entirely abandoned.

Osborne and Shepherd have been prospecting land at Blackfellow's Creek, near Lower Bucca, since April last, and raised 15 tons of stone, which yielded 12 oz. 18 dwts. of gold.

Several small trial crushings from various localities in this neighbourhood, aggregating 70 tons, have been treated at James' battery, and gave fair results.

There are but three parties working at Nana Creek. George Fauvel has received a grant from the Prospecting Vote to drive a tunnel for a distance of 150 feet, with the view of intersecting the Benson line of reef.

Albert and Alexander Nicholson hold a prospecting claim about 2 miles north-west of O'Grady's battery at Nana Creek. The main shaft is down 35 feet in dry and easily worked ground. The reef is about 18 inches wide. A crushing of 5 tons 10 cwt. of quartz from the 20-foot level yielded 18 oz. 10 dwt. of smelted gold, valued at £57 13s. 9d. They have a quantity of stone at grass, and their prospects are most encouraging.

Peter McGinley and party have a shaft sunk about 40 ft., from which they have raised a considerable amount of quartz, which has been carted to their battery, but through the excessive dry weather the supply of water has been exhausted, and crushing cannot be proceeded with. The reduction plant, although small, is a good one.

Only a few miners are engaged at Tallewadjah Creek, *via* Nana Glen. A. R. Everingham raised 15 tons 8 cwt. of quartz, which yielded 13 oz. 18 dwts. gold, to obtain which he had to perform a large amount of dead work.

J. McDonald, after much labour, realised £78 10s., being the value of 21 oz. of gold obtained from a crushing of 16 tons of quartz.

One or two parties have been employed in the vicinity of Tallewadjah Creek, *via* Nana Creek Battery, but the results obtained have been very unsatisfactory.

Sharpe and Morrow, at Avery's Creek, crushed 47 tons of quartz at their own battery for 56 oz. 14 dwt., valued at £209 8s.

None of the leases held by A. Cadell at Coramba have been worked during the year, and the battery has also been idle.

At

At Mole Creek, Keats and party have done a considerable amount of work on their 5-acre lease. The shaft has been sunk to the 264-foot level on the underlay, but the reef has not been cut.

At Upper Bucca Bucca some prospecting is going on, but there is very little of interest to report.

At Karangi, J. T. Cornish has driven a tunnel for 307 feet with the object of cutting the reef known as the Perseverance, but it is considered that the tunnel will have to be continued a much further distance before the reef is picked up.

The Queen's Record Mine is the property of a syndicate, and the main workings are situated a short distance from Upper Bucca Bucca. The leases comprise an area of 11 acres: on the average about 11 men have been employed during the year, and a considerable amount of work has been done. The quantity of gold obtained was 294 oz. 10 dwts., and has been principally gained by cyaniding the tailings accumulated from previous years' crushings.

Glass and Parry, at Upper Bucca Bucca, sank a 40-foot shaft on portion of the reef known as the Perseverance, formerly held by the Beacon Gold-mining Co., and obtained 33 tons of quartz, which yielded 22 oz. 11 dwts. 6 grs. of gold, valued at £78 19s. 6d. They are still busily engaged on the work, and are getting payable stone.

A fair amount of prospecting is being carried on by others, but with indifferent results.

Dalmorton Division.

Mining matters in this Division have been exceptionally quiet. No men have been engaged prospecting, and no quartz mines have been worked, operations being confined to about 35 men, who earn a little better than tucker, fossicking in the creeks and river beds.

The Mount Rae and Black Slate Mines have been idle all the year.

The Mosquito Creek Mine has been abandoned and the lease forfeited.

The Occidental Mine has been granted suspension of the labour conditions, the proprietors being confident of obtaining capital to work their leases.

Ford's Public Battery crushed 5 tons of stone early in the year for a return of 1 cz. 6 dwts., and as this did not pay working expenses the battery has since been idle.

The population of the field is now estimated at 390 persons, a decrease of about 100 for the year.

Woogoolga Division.

Mining has practically ceased in this Division, and no gold has been won during the year. All the gold-mining leases have been abandoned, and only one claim, situated at Corinda Creek, is now being worked. At this claim a considerable amount of work has been done. A shaft was sunk to a depth of 75 feet on a reef carrying good gold, but in consequence of the great influx of water into the workings it had to be abandoned. The prospectors (Macleod and Coreoran) are engaged in putting in a drive under aid granted by the Prospecting Board, with a view of tapping the reef at the 80-foot level, and at the same time effectually draining the shaft.

Ballina Division.

There are only about five fossickers working the "black sand" on the north beaches in this Division, and they scarcely earn sufficient to provide them with food. The amount of gold won during 1901 totalled about 31 oz., an average of between 6 and 7 oz. per man.

South Woodburn Division.

No gold was won in this Division during the year, but attention is being devoted to the beach sands and terraces, and several leases have recently been applied for with the intention of mining principally for platinum.

Murwillumbah Division.

The only mining for gold was carried on at Nobby's Creek, about 9 miles from the town, where 115 acres were taken up under authorities to enter during the last two or three months of the year. Since taking possession of the land the holders have been actively carrying on prospecting operations, and one party was getting out a couple of tons of stone to be sent to the smelting works for treatment, with the object of proving the value of the find.

COBAR MINING DISTRICT.

Cobar Division.

Gold-mining can be said to have only just held its own in this Division during the year. The great drawback is the excessive drought which this district is subject to. To enable a mine to be worked continuously, provision must, at least, be made for eight months' water supply, and the construction of a tank capable of storing sufficient for such a period is a very costly matter. The smaller mines are thus not able to make much progress, and a plentiful supply of water would effect a great difference in the output of this field. The twenty-eight tanks in the Cobar District, representing a capacity of 349,000 cubic yards, fall far short of requirements, and it is desirable that other tanks should be constructed, and especially that they should be made deeper to minimise the great loss by evaporation.

The principal mine in this Division, the Great Cobar Copper-mine, is referred to under the heading "Copper."

The Cobar Gold-mines (Limited) has carried on extensive operations during the year. The ore has been drawn principally from the stopes above the 116-foot and 216-foot levels, and in smaller quantity from the open cut. The mill and cyanide works have done good work, and the filter-press plant erected during the year for the treatment of the slimes has proved a success, although some little difficulty was at first experienced owing to the wear of the pumps, but this drawback was afterwards satisfactorily overcome. No exploratory work has been done below the 216-foot level, and the presence of copper in the ore at this depth is likely to prove a hindrance to the saving of the gold contents. As this company has, possibly, the largest artificial tank in the State, it has fortunately not suffered from the want of water.

The Occidental Gold-mining Company has won a large quantity of gold from the extensive low-grade deposit which is worked by open-cuts, having perpendicular sides of about 150 feet. Owing to the exceptional facilities for mining the stone, the year's operations have proved profitable. Here, however, as at most of the other mines, work has been interrupted by the scarcity of water, notwithstanding that the capacity of the tank was nearly doubled during the year, and at date the mine had to be shut down owing to the failure of the supply.

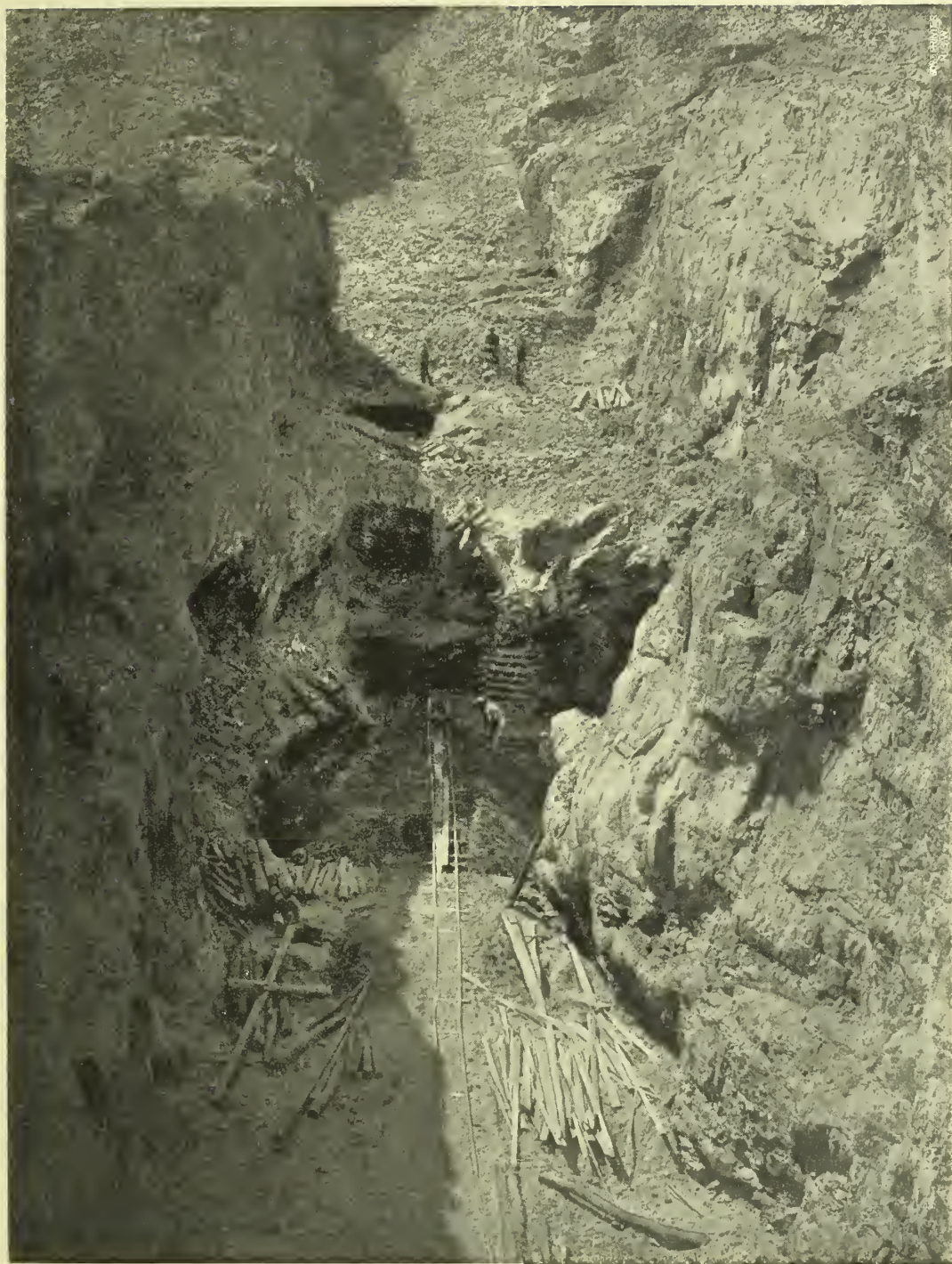
The Great Peak Gold-mining Company has obtained a considerable amount of gold during the year from the irregular bodies of ore in the mine. The deposits continue to be patchy and easily worked out, but, nevertheless, are profitable; and it is hoped they will prove more permanent as depth is attained. It is stated that there is sufficient payable stone in sight to assure 12 months' crushing, but the mine has been lying idle for want of water.

The Cobar Great Western Gold-mining Company has not done any work during the year, but a contract has been let, and operations were about to be resumed.

The Young Australian Gold-mining Company has been working the gold ores, at the junction with the cupiferous ores, with some success.

The Mount Drysdale Gold-mining Company discovered several rich bunches of silver glance carrying gold at the 200, 300 and 400-foot levels, and these were treated, together with some of the poorer ores. Large quantities of low grade ores exist untouched in this mine, work having hitherto been exclusively confined to the search for the irregular pockets of rich ore. The inadequate water supply has only permitted operations to proceed for part of the year.

The Mount Poppy Gold mining Company has a mine which ranks among the chief gold-producers of this State. It is equipped with a good mill and cyanide plant, and is most economically worked and handled. The ore taken out to date constitutes a huge working sample of the mine, as developed down to the 250-foot level. The whole width of the reef has been removed on the two levels to a height of 12 to 14 feet, and the ore thus obtained passed through the mill without any selection or grading. This, therefore, furnishes a practical and reliable basis on which to estimate the value and quantity of the ore from the 250-foot level to the surface. The result has proved the reef highly payable, and has justified the extension of the plant by 40 head of stamps, making 80 in all, and the design and erection of a slime plant, &c. The conservation of water is also receiving attention, and drains have been excavated to enable all the water to be collected from a radius of 7 miles round the town.



THE COBAR GOLD MINES, LIMITED.
(Open cut, looking north.)

Budd and party have found what is thought to be an extension of the Mount Boppy reef, about a mile distant, and the ore at the 150-foot level gives good promise, both as to quality and quantity.

The estimated total quantity of gold won in this Division during the year is 42,299 oz. valued at £145,146; while the estimated net value of all minerals won is £343,249.

[A very complete report by Mr. Inspector Schloesser, on the year's operations in this Division, will be found in the Appendix to this volume.]

Nymagee Division.

The Restdown Field has made little progress during the year, the only claims at work being the "Girl in Blue" and the "New Reward." At the latter a discovery of good ore has recently been made.

Nyngan Division.

But slight progress has been made in developing the mineral resources of this district during the past year. In fact, with the exception of a prospecting area on Wilga Downs, where B. Fleming has been successful in proving payable stone at a depth of 100 feet, operations have been virtually confined to around Girilambone.

To the west of the town innumerable quartz leaders exist, showing occasional very rich stone in patches. The hope of finding a payable reef has stimulated enterprise to some extent, and further encouragement has been given by the promise of private individuals to erect a battery on the field.

It is confidently asserted that if an up-to-date battery be erected there, it will successfully open up what is undoubtedly a good poor man's field, whilst future operations at a depth may disclose much better results.

During the year, work has been retarded by lack of sufficient water, and in several instances suspension of labour conditions has been granted to the claim holders.

Gilgannia Division.

The gold-mining industry in this Division has for some years past been on the wane, and nothing has occurred during the year to lead to any expectations of a revival in the near future.

Although there are three or four parties of miners conducting operations, there is only one claim (known as "Her Dream") that has been worked with satisfactory results. From this claim 342 tons of stone were crushed for a yield of 792 oz. 15 dwt. of gold.

The estimated quantity of quartz raised during the year was 408 tons, yielding 858 oz. of gold, valued at £3,500.

Mount Hope Division.

There was no gold-mining carried on in this Division during the year.

The Mount Allan Gold-mine was shut down, and the property has been purchased by the Great Central Freehold Copper-mining Company.

Bourke Division.

There has practically been no mining in this Division during the past year.

A little prospecting for gold has been carried on in the neighbourhood of Byrock by F. Smith, who has put down a shaft, and although a defined reef has been struck, the results are not very encouraging.

Another trial shaft has been sunk about 12 miles from Mooculta Railway Siding by W. Tully, but in this case also the work is still incomplete, so that no positive results are yet forthcoming.

ALBERT MINING DISTRICT.

Milparinka and Tiboolurra Divisions.

After a succession of four or five dry years, the rainfall at Milparinka for 1901 amounted to only 4.64 inches, and, as a result, the mining industry in this District is in a depressed state; operations, with the object of an immediate return, have necessarily been confined to fossicking in old ground, and to prospecting.

In addition to the scarcity of water, the remoteness of the field, and the hardships of the climate, an ever-present drawback to the development of the reefs has been the want of crushing and gold-saving machinery. This impediment is now, however, in course of removal, and hopes are entertained that Mr. Reid's exertions in putting into working order the battery and cyanide plant at West Warratta will be completely successful. The labour expended, and outlay incurred, in getting up stone at Warratta and Little Bendigo during the past year may then prove fruitful. The lease-holders and miners at these places, aided by grants from the Prospecting Vote, have persevered in working the reefs and raising stone, although their only prospect of crushing has been since Mr. Reid commenced the work of repairing the battery and clearing the abandoned shaft at Warratta about four months ago. It is thus reasonably expected that during 1902, the yield of gold from the reef will show a substantial increase.

Considerable encouragement was given by the discovery by McNulty and party, in November last, at Warratta, of a promising show on a line of reef that had been worked previously. They have obtained rich specimens near the surface at different places along the reef for a distance of 20 yards, but it remains to be proved whether the stone at a depth fulfils the promise of the surface show.

Jeffers and party at Warratta West, and the lease-holders at Little Bendigo, have considerable quantities of stone ready for the battery, and expect that the yield will prove satisfactory.

In alluvial workings the only claim on a deep lead is Glover's at Mount Browne—from this, nearly an ounce to the load has been obtained in recent washings.

The fossickers at Mount Browne and Tiboolurra gain barely sufficient for the necessities of life, but in more favourable circumstances, and with a sufficient supply of water, the results would be much better.

After years of bitter experience in contending against the effects of the trying climate, the scarcity of water, the hardships and privations caused by the remoteness from populous centres, and the desert country between, practical miners are still working on undeterred, and firm in the opinion that gold is plentiful in reefs and alluvial in this District, and that capital judiciously expended would justify their faith. For years past no capital has found its way to these parts, and the want of it is probably the strongest factor in retarding the progress of the field.

Wilcannia Division.

At the only place where gold has been mined for, namely, at the Bonley Gold Mining Co.'s 10-acre lease, parish of Parkes, about 35 miles S.S.W. from Wilcannia, no operations have been carried on during the past twelve months. The proprietors have exhausted their own funds, and are endeavouring to dispose of the property.

DREDGING.

Considerable attention was centred in this class of mining during the year, and although the yields as a whole have not been up to expectations, yet in the aggregate a considerable amount of gold has been won.

From the returns received it appears that the gold saved by the dredging plants during the year amounted to 23,585 oz., valued at £89,628, the yield contributed by 23 "bucket" dredges being 19,328 oz., and that by 10 "pump" dredges 4,257 oz.

A number of satisfactory and highly payable returns are recorded, but the result of the year's operations has shown that, in the case of some of the holdings on which plants were erected, a proper examination of the ground was not first made, and on trial it has been found to be quite unsuitable for dredging, and work has consequently been abandoned, while on many of the other areas, although

the yield has proved quite up to expectations, work has not, so far, been able to be carried out successfully, owing to the difficult nature of the ground and the excessive cost of repairs, &c., consequent upon repeated breakages. In all enterprises of this kind the experimental work is tedious and costly, and now that dredging has actually been tried on several of the watercourses of the State it is found that considerable alterations will be required to be made in the machinery. These initial difficulties are being overcome and with the experience gained there seems to be no reason to doubt but that several of these now non-paying dredging properties will be placed on a profitable basis.

It is pleasing to note that the dredges which were erected on unprofitable or unsuitable areas will not be put out of use, but are being transferred to other sites where better returns are anticipated.

The area held under lease for dredging purposes at the end of 1901 was 8,702 acres.

The number of dredging plants erected, or in course of completion, at the end of the year was forty-three, of a declared value of £289,333.

There were two dredges engaged in working for tin, and another was also saving tin in addition to the gold.

The following particulars respecting the operations of the "Bucket" and "Pump" dredges are taken from the returns where the necessary details have been furnished by the dredge masters:—

<i>"Bucket" Dredges.</i>		
Number of dredges	14	
" cubic yards of material treated	3,333,500	
Total quantity of gold won.....	16,037 oz. 16 dwt. 22 gr.	
Value of gold won.....	£60,936 9s. 8d.	
Average yield per cubic yard of material treated	2·31 gr.	
" value obtained per cubic yard of material treated	4·39d.	
<i>"Pump" Dredges.</i>		
Number of dredges	6	
" cubic yards of material treated	661,926	
Total quantity of gold won.....	3,669 oz. 13 dwt. 0 gr.	
Value of gold won	£13,956 0s. 9d.	
Average yield per cubic yard of material treated	2·66 gr.	
" value obtained per cubic yard of material treated	5·06d.	

The data at hand do not permit of the cost of working the dredges being estimated, but it is known that the "pump" dredge is much more costly to run than the "bucket" dredge.

The following details are taken from the reports of the Wardens and Mining Registrars:—

Araluen Division.

The quantity of gold won during 1901 by the dredges working in this Division was 11,704 oz., as against 4,903 oz. for the year 1900—an increase of 6,801 oz.

There are two suction and eight bucket dredges in this Division, while another dredge, of the bucket type, was in course of construction at the close of the year for the Araluen Consolidated Company, and was expected to be in operation in a few months' time.

The Moreings Flat Gold Sluicing Syndicate at Jembaicumbene has not worked during the year; efforts are, however, being made with the object of starting operations afresh. The machinery is on the spot and fixed all ready for work, and as the ground is shallow, it is anticipated that little difficulty will be met with.

The Federal Centrifugal Gold Sluicing Company, also on the Jembaicumbene Creek, worked only part of the year, as it was found that operations were too costly, and after expending some £24,000, the dredge was shut down. It is proposed to re-construct the Company and substitute a bucket dredge.

The Jembaicumbene Dredging Company commenced operations in February on the Jembaicumbene Swamp, and has the distinction of being the first Company in the District to declare a dividend, the amount of same being 6d. a share. The ground varies in depth from 6 to 20 feet, there being generally about 2 feet of black soil, then from 2 to 6 feet of clay, and 2 to 6 feet of gravel, with the wash varying from a few inches to about 2 feet, the whole being somewhat readily worked. The average yield obtained by this dredge was about 45 oz. a week. There is a large area of ground on the Jembaicumbene Creek on which machinery has not been placed yet, but the owner intends to put three bucket-dredges thereon in the course of the current year.

All the dredges in Araluen proper are of the bucket type, and there is no doubt that this is the most suitable kind of dredge, as the ground is principally loose drift with a soft granite bottom.

The proposed amalgamation of the Araluen Proprietary and the Araluen Valley Consolidated Companies fell through, and each Company is working its ground independently. Both dredges have had various stoppages for repairs. The yields obtained by these Companies for the year were 1,181 and 1,736 oz. respectively.

The Araluen Central Company commenced operations in March, and with the exception of two or three short periods, has been constantly at work, and has produced a large quantity of gold. This dredge has established a record for a week's work by recovering 165 oz. of gold, the yield for the three previous weeks aggregating a little over 450 oz. Two dividends of 6d. and 1s. a share have been declared.

The Crown Flat Dredging Company (Perry) and the Araluen Dredging Company (Tulloch and Hughtan), are private companies, and their returns have been most satisfactory.

The Araluen Dredging Company has two dredges in operation, the No. 2 dredge only commencing work on 5th March.

The Araluen Junction Company commenced work in July on the Dena River, but after a short run operations were suspended and the Company reconstructed under the title of the New Araluen Junction Company. The dredge was floated a mile or more up the river and a fresh start made at the close of the year.

Taken on the whole, the industry in this Division is in a flourishing condition, and a considerably augmented output by the dredges is confidently looked for.

Little River Division.

The result of the operations conducted in this Division during the year cannot be said to have been successful.

The New Zealand Mines Trust, at Half Moon Flat, worked more or less constantly during eight months of the year. The plant consists of a centrifugal pump, and is valued at £10,000. The gravel has been found to be very heavy, and has caused great friction to the working parts of the machinery, while the wash has not been so rich as was anticipated,



THE COPE'S CREEK DREDGING COMPANY'S CENTRIFUGAL PUMP DREDGE.

anticipated, and the year's operations resulted in a decided loss to the Company. It has been found necessary to cut races in the solid rock, in some instances as deep as 16 feet, while one race averages 8 feet deep for a distance of 5 chains, and as this has to be done every time the plant is moved, which is about once a month, the expense of the work is apparent. In addition, every bit of the bottom must be picked up, as it is found that owing to the great force of water used to shift the dirt a considerable proportion of the gold is forced into the crevices.

The Little River Gold Dredging Company was working with a bucket dredge, but operations ceased in the middle of August, as owing to the unpromising results obtained the capital became exhausted, and it was found necessary to reconstruct the Company. It is understood that the Company will be in a position to resume work during the opening months of this year.

The Shoalhaven Gold Dredging Company, owing to the smallness of the returns and the expense of working the dredge, was compelled to relinquish operations, and the Company has been wound up.

The Shoalhaven Terraces Company ceased work towards the end of July, as the yield fell far short of expectations, and would not permit of the dredge being kept running profitably. The quantity of gold obtained per each cubic yard of material was about 1.07 grains. This dredge has been dismantled and removed to Araluen.

The total amount of gold obtained by the dredges in this Division is estimated at 1,269 oz., valued at £4,974, and the value of the plants when they were in operation is set down as £30,795.

Nerriga Division.

The Jerriknorra Sluicing Company erected a suction dredge on its ground on the banks of the Shoalhaven River, at a cost of some £10,000. Owing, however, to the very heavy expense incurred in running the dredge, as compared with the quantity of gold won, the company was compelled to shut down, after working for about six months. It is reported that efforts are being made to let the dredge on tribute.

The area held by the Oallen Treasury Gold Company, Limited, is situated on the north side of the Shoalhaven River, at Oallen's Crossing. The wash, which is from 20 to 40 feet in thickness, is treated by hydraulic sluicing, the water being conveyed to the nozzles through some 2,000 feet of 10-inch steel riveted piping. A large stone dam, 55 feet in height, has been constructed across Oallen Creek. The reservoir when full will cover an area of about 400 acres, and the water will be impounded to a height of 75 feet above the river level. Work has, so far, been confined principally to opening up faces of wash and constructing tail-races, as, owing to the small rainfall, the water has had to be syphoned from the reservoir, and the Company has thus been placed at a great disadvantage. The feature of the scheme, as claimed by this Company, is the enormous quantity of washdirt it should be enabled to treat at a very low cost, once a full supply of water is available.

The total amount of gold won by dredging in this Division is estimated at 543 oz. 15 dwt., valued at £2,186.

Braidwood Division.

The dredge of the Colombo Dredging Company has been at work during the past year on the Shoalhaven River, about 7 miles from Braidwood, but operations have not proved a financial success, and the Company has, consequently, disposed of the dredge, which is to be dismantled and rebuilt by the purchasing company on an area at Jembaieumbene Creek. The yield for the year was 660 oz. of gold, valued at £2,580, and the quantity of material treated for this return is estimated as 295,500 cubic yards, which gives an average of 1.07 grs. per cubic yard.

Stuart Town Division.

There are five bucket dredges in this Division—four are in operation and one is in course of completion.

Garland's No. 1 dredge is located at Lower Mookerawa, at the junction of the Mookerawa Creek with the Macquarie River. The dredge has not been sufficiently stable to successfully overcome the large boulders and the hard bed of cement in the river, consequently, frequent breakages have occurred to the buckets and gear, and the dredge has been idle, undergoing repairs, for a considerable portion of the year. During the time the dredge was in operation, good returns were obtained, but these were largely discounted by the cost of the repairs.

The Associated Gold Dredging Company took over its No. 1 dredge on the 2nd November last. The site of operations is near Burrandong, and the results obtained to the end of the year appeared to be very encouraging. The No. 2 dredge of this Company was in course of construction, and it is expected to be completed by the end of March, 1902.

The Macquarie No. 1 Gold Dredging Company has had a very disappointing year. Soon after the dredge commenced active operations, some very good yields were obtained, the highest being 95 oz. for one week's work. The dredge subsequently cut into worked ground, but at the close of the year it had been got back to the place where good returns were obtained, and it is anticipated that this year, 1902, will show an improvement on those of the previous year.

The Macquarie No. 2 Gold Dredging Company started operations in January, 1901, but shortly afterwards the dredge was sunk, owing to a hole being knocked in the bottom of the pontoon by a rock. After a delay of some three months, the dredge again commenced operations in ground of medium depth, and fair returns were obtained, going as high as 29 oz. for a week's work in the month of September. Subsequently the returns were so reduced, and as there seemed to be no sign of any improvement, the directors decided to suspend operations, and a meeting of the shareholders was called for January, 1902, to discuss the position of the Company.

The yield from the dredges in this Division for the year was 2,789 oz., valued at £10,925, and the value of the plant is estimated at £49,000.

Sofala Division.

The Thron River Gold Dredging Company's No. 1 dredge had a successful year. Work was in progress for 5,169 hours, during which time 193,239 cubic yards of material were treated for a yield of 1,056½ oz., valued at £3,746. The ground was rough and stony, and had been mostly worked before. The yield is equal to 2.545 gr. per cubic yard.

The No. 2 dredge of this Company worked 4,604 hours, and treated 186,359 cubic yards of material for a return of 514 oz., valued at £1,850. This ground was similar in nature to that operated on by the No. 1 dredge, and most of it had previously been worked. The yield is equal to 1.323 grs. per cubic yard.

The Sofala Gold Dredging Company shut down in September last. The dredge has been sold and is to be dismantled and re-erected on another lease. The whole of the ground has been found to be worked, and nothing but the poor upper gravels left. Apart from the poorness of the ground the difficulty of dredging has been much greater than anticipated. The gravel, though not cemented, is very angular and packs closely, while the buried timbers in the old workings added to the difficulties of putting through large quantities of material. The average quantity treated per week was 4,000 cubic yards, and the yield during the last eighteen weeks 1.074 grs. per cubic yard.

Kiandra Division.

The Kiandra Gold Dredging Company had a very successful year, and declared £3,000 in dividends to the end of its first financial year—30th September, 1901. At the close of the year the dredge was being removed through the gorge to Jackass Flat, where it is anticipated even better returns will be obtained.

Cooma Division.

The Snowy and Thredbo Gold Dredging Company commenced operations in May last at the junction of the Snowy and Thredbo Rivers. The auriferous gravels were found to be lying principally on bars, which could not be economically operated on, and as actual work, extending over several weeks, failed to disclose any extensive beds of wash, operations were abandoned. The Company accordingly went into liquidation, the plant was sold, and the dredge was being dismantled at the close of the year.

The Gungahline Gold Dredging Company only commenced operations on Snowy Plain on the 27th December, and consequently no actual work was done during the year 1901.

Bathurst (Warden's) Division.

The Fish River Gold Dredging Company started work on the Fish River, near Locksley, during the year. The value of the plant is estimated at £6,880. Some 86,000 cubic yards of material were treated for a yield of 425 oz. of gold, valued at £1,654, which represents a return of 2.372 grs. per cubic yard.

Uralla Division.

Work has been continued by the Brown's Paddock Gold Mines throughout the year on the Rocky River with a "pump" dredge. The yield obtained has been satisfactory, and shows a very substantial increase on that of the previous year.

Operations were commenced by Francis and Party on the 1st September last on the Rocky River. The dredge owned by this party is also of the pump type, and the value of the plant is estimated at £6,000. The want of sufficient water has greatly retarded work, and although the prospects are good, the yield has, on this account, been very small.

The total amount of gold won by this class of mining during the year was 1,275 oz., valued at £1,842 6s.

Tingha Division.

The Cope's Creek Dredging Company is at work within about 2 miles of Tingha, on Cope's Creek. The capital of the Company consists of 36,000 shares at 10s., and about £9,000 has been spent in the construction of the dredge, which is of the "pump" type. During the early months of the year operations were greatly hampered, owing to shortage of water and thenceforward by the great number of boulders on the bed rock which prevented the treatment of the material in proper bulk. The results obtained, however, prove the ground to be payable—3 acres yielding £1,000 per acre. It is proposed to increase the plant and put on better saving appliances, when the Company expect to treat an acre of ground monthly and save more tin.

Glen Innes Division.

The Glen Elgin Gold and Tin Dredging Company commenced work on the Timbara River towards the end of April last. The dredge is of the bucket type, and is valued at £6,700. Operations have been conducted both in stream and bank, and during the period the dredge was at work it is estimated that 186,430 cubic yards of material were treated for a yield of 506 oz. of gold, valued at £1,544, and 2 tons 675 cwt. of tin ore. The yield of gold is equal to 1303 grs. per cubic yard.

Wilson's Downfall Divisions.

The Wylie Creek Tin Mining and Dredging Company has erected a bucket dredge at Wylie Creek, and the trial run has proved satisfactory. Beyond this no work had been done up to the end of the year, as owing to the lack of sufficient water the dredge was laid up. The value of the dredge and plant is £7,000.

Young Division.

The Burrangong Gold Dredging and Sluicing Company at the old Lambing Flat, and operating with a "pump" dredge, has experienced many difficulties during the past year, while stoppages and delays from various causes have been frequent. The principal trouble is caused by the heavy running drift, and this is accentuated by the sand and tailings from the old alluvial workings; all these have to be constantly removed to enable the excavation to be deepened, and the operations of the Company have consequently been seriously hampered. At the close of the year, however, sufficient progress had been made with the work to permit of the plant being lowered down to the level which will enable the bottom to be reached, and good returns are now confidently looked for.

The Maori King Gold Dredging and Sluicing Company at Spring Creek expects to have its plant completed by May this year, the estimated cost of same being £5,000. All the excavations have been finished, most of the machinery is on the ground, and the construction of the dams, &c., have been completed. The dredge will be fitted with Rankin's Patent Delver, which, it is claimed, will enable the drifts to be overcome, no matter how deep the water may be.

Adelong Division.

The Grahamstown Gold Estates purchased the pump dredge previously worked by the Jennings Gold Sluicing and Dredging Company, and resumed operations towards the end of the year: the plant is reported as working smoothly and well, and it is confidently expected that the results during this year will be satisfactory.

Tumut Division.

The dredge at Adjungbilly Creek worked for about five months, but operations proved the ground to be quite unpayable, and the dredge was sold and dismantled.

The Argalong (Sandy Creek) Gold and Tin Proprietary Dredging Company is erecting a bucket dredge at Sandy Creek, and it is expected that the same will be completed by March of this year.

Tumbarumba Division.

The Burra Sluicing Company has a hydraulic plant at work on the Burra Creek in this Division.

The claim is an old-established one, and has been worked by means of a tail race for a number of years. Since the present Company purchased the property, a sluicing plant, valued at £2,000, has been erected, and a water race cut for a distance of 13 miles.

The Company has secured a much larger area of land than was held formerly, and has made arrangements for the erection of a complete plant, capable of treating 9 acres per annum. It is anticipated that this plant will be ready to start operations in the month of March of the current year.

The yield for the past year was 403 oz. of gold, valued at £1,392, and 2 tons of tin ore, valued at £180.

Burrowa Division.

The syndicate known as the Cunningham Creek Pioneer Pump Dredging Company commenced operations at the end of September on the Cunningham Creek, near McMahon's Reef. Only one paddock was treated, consisting of nearly all old ground, from which about 170 oz. of gold had been extracted some two years ago. The actual quantity of wash removed from about 18 square yards of bottom was not above 20 loads, a great deal of time being taken up by preparatory work, and the prospects of securing payable returns seems somewhat remote.

Drake Division.

The expectations as to the gold-dredging industry in this Division have not been realised. The Clarence River Gold Dredging Company in the early part of the year, after expending about £7,000 in the erection of a powerful dredge, suspended operations, as the result of a short run of the dredge was not satisfactory. The dredge has since been dismantled and the machinery sold, and is to be re-erected on the Tuross River.

The New Zealand Company at Paddy's Flat, on the Clarence River about 5 miles up the river from the Clarence River Gold Dredging Company, which had at the end of the year 1900 completed its dredge at a cost of £7,000, commenced operations in the early part of the year, and ran the dredge for about three months, but it was found that further operations could not be carried on at a profit, and towards the end of the year work was suspended, the dredge dismantled, and the machinery sold. A little gold was obtained but not in payable quantities, and one of the things said to militate against dredging operations is the great number of large boulders in the bed of the Clarence River. This plant is also to be taken out of the district.

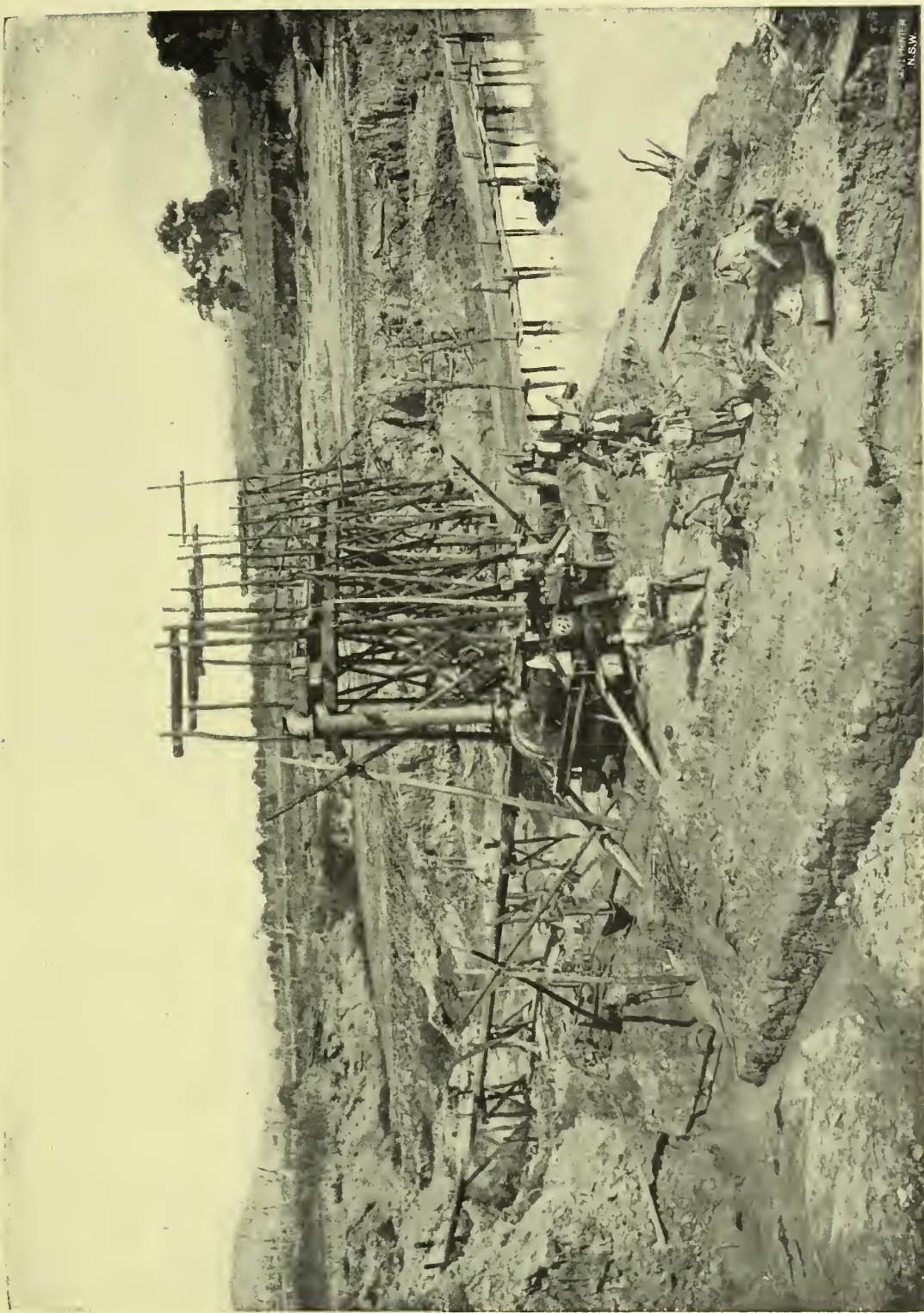
The dredge which was being constructed by the North Pioneer Company at the junction of the Clarence and Timbarra Rivers, near Tabulam, has not yet commenced operations, as, owing to the death of Mr. John Rossiter all work had to be suspended. A new dredge master has now been appointed, and he is making some alterations to the dredge; the elevators have been dispensed with and sluice boxes substituted on the same lines as the dredge working at Jembaicumbene. The dredge is expected to be in full operation by the month of March, 1902. The prospects of this Company obtaining payable gold are promising, as in this part of the river there are no large boulders to contend with—the bottom being smooth and composed of conglomerate or sandstone. The cost of the machinery is £4,500.

Tamworth Division.

Nothing has been done upon any of the dredging leases in this Division during the year, with the exception of preliminary prospecting at Anderson's Flat, Bowling Alley Point, by the Anderson's Flat Syndicate. The prospects obtained have not been made public, but it is gathered that operations will be commenced in the course of a few months. The dredging for tin will also, it is understood, be started in the Bendemeer Division at an early date.

Taree Division.

No dredging areas have been applied for in this Division, nor has any prospecting to that end been done, though it is possible that the Upper Manning, since it receives the waters of the Cells, Nowendoc, Giro, and Copeland Gold Fields, may offer favourable inducements for the establishment of the dredging industry.



THE BURRA SLUICING COMPANY'S PLANT, BURRA CREEK.



Kookabookra Division.

Operations were commenced on the Mitchell River by a Newcastle Syndicate with a pumping plant, with the object of recovering gold and tin, but the results proved unremunerative and the Company shut down.

Tuena Division.

Dredging operations were not started on any of the leases that have been taken up on the Abercrombie River and Tuena Creek, owing to the question of titles being in dispute. This has proved a drawback to many parties that would be willing to prospect and take up claims in the river and creek, on account of the ground being held by the dredging companies.

Mudgee (Warden's) Division.

A number of leases have been applied for as dredging areas in this Divisions, but operations have not yet been commenced, and, consequently, there is nothing to add to the report of last year.

Moruya Division.

Several leases have been applied for on the Deua River, near Araluen, for dredging purposes, but operations have not yet been commenced.

Nowra Division.

Operations have not yet been commenced by any of the lease-holders of dredging areas in this Division.

Nerrigundah Division.

Mr. Jas. McSharry, the representative of the holders of two dredging areas on the Tuross River, was, at the close of the year, engaged in completing arrangements for the building of the pontoon, and expects to be able to commence dredging operations early in the month of May of the current year.

Wagonga Division.

A large area of ground has been taken up in the Punkalla Valley, leading from Mt. Dromedary into the Wagonga River, for dredging. Good prospects have been obtained by bores, and satisfactory returns are confidently looked for.

The Punkalla Dredging Company expects to have the dredge and plant on the ground and at work during the current year.

Delegate Division.

An area has been secured under the Gold and Mineral Dredging Act on the Delegate River, but at the close of the year operations had not been started.

Bombala Division.

On the dredging lease held by Mr. Kent Johnston at Little Plains River, so far, only initiatory work has been done. A race has been formed in order to work a Pelton wheel.

SUMMARY OF GOLD-MINING OPERATIONS FOR YEAR 1901.

The statistics from which the following Table has been compiled are collected as carefully as possible by the Mining Registrars, but in many instances they experience considerable difficulty in obtaining correct information.

This Table shows approximately the Quantity and Value of the Gold won, the number of Miners employed in Mining for Gold, and the Value of Machinery at the Gold Mines, and also the Gold Dredging Plants in each Mining Registrar's Division and Mining District of the State of New South Wales during 1901.

Mining Registrar's Division.	Quantity of Gold Won.				Value of Gold Won.	Number of men employed.				Estimated Value of Machinery and Plant at the Gold-mines, and also Gold-dredging Plants.
	Alluvial.		Quartz.	Total.		Alluvial.		Quartz.	Total.	
	Other than by Dredging.	By Dredging.				European.	Chinese.			
ALBERT MINING DISTRICT.										
	oz. dwt. grs.	oz. dwt. grs.	oz. dwt. grs.	oz. dwt. grs.	£ s. d.					£
Broken Hill .....	.....	.....	.....	*372 12 0	1,490 8 0	...	...	...	...	...
Milparinka	318 0 0	.....	.....	318 0 0	1,272 0 0	40	...	10	50	300
Tibooburra	270 0 0	.....	.....	270 0 0	1,080 0 0	35	3	6	44	1,000
Wilcannia .....	.....	.....	.....	.....	.....	...	...	†2	2	1,000
	588 0 0	.....	.....	960 12 0	3,842 8 0	75	3	18	96	2,300
* Contained in silver ores. † Prospectors only.										
BATHURST MINING DISTRICT.										
Bathurst	67 0 0	.....	1,176 0 0	1,243 0 0	4,559 12 6	100	...	150	250	1,200
Blayney .....	.....	.....	.....	†	.....	10	...	42	52	960
Burrage	383 0 0	.....	8 3 0	391 3 0	1,419 2 8	40	...	36	76	500
Canowindra .....	.....	.....	1,207 0 0	1,207 0 0	3,920 0 0	12	...	75	87	6,040
Carecar .....	.....	.....	.....	.....	.....	...	...	...	...	...
Cowra	6 10 0	.....	128 0 0	134 10 0	549 0 0	75	...	15	90	738
Molong .....	.....	.....	.....	*	.....	...	...	30	30	300
Mount M'Donald ..	101 0 0	.....	2,038 13 0	2,139 13 0	7,854 16 0	166	4	60	230	11,092
Mandurama .....	.....	.....	1,497 8 0	1,497 8 0	5,328 10 0	20	...	60	80	15,400
Newbridge.....	89 0 0	.....	32 6 0	121 6 0	455 5 0	6	...	50	56	3,010
Oberon	80 13 18	.....	739 0 0	819 13 18	2,995 3 6	24	...	52	76	1,473
O'Connell	120 0 0	425 0 0	.....	545 0 0	2,134 0 0	20	...	...	20	6,880
Orange	3,047 0 0	.....	1,382 0 0	4,429 0 0	15,982 0 0	91	9	200	300	34,947
Roekley	488 0 0	.....	2,282 0 0	2,770 0 0	9,608 0 0	42	8	66	116	9,300
Sunny Corner	2,461 0 0	.....	159 0 0	2,620 0 0	9,079 0 0	20	5	68	93	10,100
Trunkey.....	517 0 0	.....	50 0 0	567 0 0	2,161 0 0	80	8	20	108	750
Tucua	971 16 0	.....	673 0 0	1,644 16 0	6,472 16 3	90	5	30	125	2,210
Wattle Flat	1,140 0 0	.....	1,340 0 0	2,480 0 0	8,523 0 0	140	15	130	285	2,700
	9,471 19 18	425 0 0	12,712 10 0	22,609 9 18	81,041 5 11	936	54	1,084	2,074	107,600

* Not ascertainable. ⊙ Included in Mandurama Division. † Flyers' Creek and Forest Reefs included in Orange Division. Particulars from other centres not obtainable.

Mining Registrar's Division.	Quantity of Gold won.				Value of Gold won.	Number of Men employed.				Estimated Value of Machinery and Plant at the Gold- mines, and also Gold- dredging Plants.
	Alluvial.		Quartz.	Total.		Alluvial.		Quartz.	Total.	
	Other than by Dredging.	By Dredging.				European.	Chinese.			
CLARENCE AND RICHMOND MINING DISTRICT.										
	oz. dwt. grs.	oz. dwt. grs.	oz. dwt. grs.	oz. dwt. grs.	£ s. d.					£
Ballina	31 0 0	.....	.....	31 0 0	119 0 0	5	...	...	5	20
Coramba	40 0 0	.....	611 0 0	651 0 0	2,148 0 0	5	...	70	75	7,080
Dalmorton.....	330 0 0	.....	1 6 0	331 6 0	1,158 15 0	43	...	23	66	2,000
Grafton.....	66 0 0	.....	55 0 0	121 0 0	427 19 6	7	2	...	9	...
Murwillumbah.....	.....	.....	.....	*	.....	...	...	6	6	...
South Woodburn.....	.....	.....	.....	*	.....	5	...	...	5	10
Woogoolga .....	.....	.....	.....	*	.....	2	...	...	2	...
	467 0 0	.....	667 6 0	1,134 6 0	3,853 14 6	67	2	99	168	9,110

CLARENCE AND RICHMOND MINING DISTRICT.

	oz. dwt. grs.	oz. dwt. grs.	oz. dwt. grs.	oz. dwt. grs.	£ s. d.					£
Billina	31 0 0	.....	.....	31 0 0	119 0 0	5	...	...	5	20
Coramba	40 0 0	.....	611 0 0	651 0 0	2,148 0 0	5	...	70	75	7,080
Dalmorton	330 0 0	.....	1 6 0	331 6 0	1,158 15 0	43	...	23	66	2,000
Grafton	66 0 0	.....	55 0 0	121 0 0	427 19 6	7	2	...	9	...
Murwillumbah .....	.....	.....	.....	*	.....	...	...	6	6	...
South Woodburn .....	.....	.....	.....	*	.....	5	...	...	5	10
Woogoolga .....	.....	.....	.....	*	.....	2	...	...	2	...
	467 0 0	.....	667 6 0	1,134 6 0	3,853 14 6	67	2	99	168	9,110

* Prospecting or fossicking only.

COBAR MINING DISTRICT.

Bourko .....	.....	.....	.....	.....	.....	...	...	5	5	.....
Cobar† .....	.....	.....	42,299 0 0	42,299 0 0	145,146 0 0	...	...	610	610	148,945
Gilgunnia .....	.....	.....	858 0 0	858 0 0	3,500 0 0	...	...	20	20	3,560
Mount Hope .....	.....	.....	.....	*	.....	...	...	4	4	...
Nyngan .....	.....	.....	10 0 0	10 0 0	35 0 0	...	...	5	5	30
	.....	.....	43,167 0 0	43,167 0 0	148,681 0 0	...	...	644	644	152,535

† Including Mount Drysdale. * Prospecting only.

HUNTER AND MACLEAY MINING DISTRICT.

Bulladelah .....	.....	.....	26 10 0	26 10 0	84 15 0	...	...	12	12	1,000
Copeland	40 10 0	.....	105 12 0	146 2 0	495 3 0	4	...	36	40	3,655
Dungog .....	.....	.....	209 0 0	209 0 0	741 5 0	...	...	45	45	1,740
Kempsey .....	.....	.....	.....	.....	.....	...	...	...	...	100
Taree .....	.....	.....	.....	*	.....	1	...	6	7	150
	40 10 0	.....	341 2 0	381 12 0	1,321 3 0	5	...	99	104	6,645

* Prospecting only.

LACHLAN MINING DISTRICT.

Alectown	40 0 0	.....	14 0 0	54 0 0	122 0 0	37	...	8	45	70
Barnedman .....	.....	.....	2,446 1 12	2,446 1 12	8,344 11 2	...	...	59	59	8,460
Cargo .....	.....	.....	154 19 0	154 19 0	571 0 4	12	...	40	52	1,200
Condobolin .....	.....	.....	499 0 0	*499 0 0	1,076 0 0	...	...	36	36	600
Cootamundra .....	.....	.....	3,215 0 0	*3,215 0 0	8,226 17 1	...	...	50	50	1,200
Cudal .....	.....	.....	.....	.....†	.....	...	...	12	12	50
Fifield	99 10 0	.....	47 10 0	147 0 0	554 10 0	15	...	20	35	85
Forbes .....	.....	.....	4,361 0 0	4,361 0 0	15,591 14 4	50	...	140	190	9,410
Grenfell	240 0 0	.....	586 0 0	826 0 0	2,959 0 0	90	...	60	150	3,250
Gundagai .....	.....	.....	6,324 13 9	6,324 13 9	23,529 9 9	200	...	120	140	33,850
June	28 0 0	.....	821 19 0	849 19 0	2,881 16 0	6	...	30	36	1,500
Murrumburrah	181 9 0	.....	25 10 0	208 19 0	791 0 6	20	...	15	35	600
Narrandera .....	.....	.....	217 10 0	217 10 0	614 10 0	...	...	10	10	1,655
Parkes	345 6 1	.....	3,791 12 19	4,136 18 20	14,892 19 9	75	...	180	255	12,577
Reefton .....	.....	.....	115 0 0	115 0 0	446 0 0	...	...	8	8	60
Temora	1,318 0 0	.....	140 0 0	1,458 0 0	5,599 0 0	20	...	28	48	1,750
Wyalong .....	.....	.....	21,717 0 0	21,717 0 0	86,870 0 0	...	...	800	800	60,500
Wyalong West .....	.....	.....	.....	.....	.....	...	...	44	44	1,700
Yalgogrin .....	.....	.....	946 0 0	946 0 0	3,069 0 0	...	...	...	...	12,150
Young	771 0 0	6 0 0	.....	777 0 0	3,010 17 6	100	...	...	100	...
	3,023 5 1	6 0 0	45,422 15 16	48,452 0 17	179,150 6 5	445	...	1,660	2,105	150,656

† Prospecting. * Contains quantity of silver, &c.

MUDGEE MINING DISTRICT.

Cobbora	72 0 0	.....	.....	72 0 0	241 19 10	20	...	3	23	130
Capertee	200 0 0	.....	.....	200 0 0	775 0 0	50	...	...	50	.....
Dubbo .....	.....	.....	.....	.....*	.....	18	...	...	18	.....
Gulgong	1,140 0 0	.....	130 0 0	1,270 0 0	5,385 0 0	300	...	40	340	2,000
Hargraves	398 0 0	.....	829 10 0	1,227 10 0	4,442 12 0	90	20	80	190	2,900
Mudgee	200 0 0	.....	.....	200 0 0	750 0 0	130	10	70	210	360
Peak Hill	52 0 0	.....	7,284 10 0	7,336 10 0	28,209 16 3	50	...	300	350	37,940
Wellington	512 0 0	.....	4,322 0 0	4,834 0 0	16,419 0 0	80	4	300	384	14,860
Windeyer	896 0 0	.....	902 0 0	1,798 0 0	7,079 16 0	100	20	75	195	3,000
	3,470 0 0	.....	13,468 0 0	16,938 0 0	63,303 4 1	838	54	868	1,760	61,130

* Not ascertainable.

NEW ENGLAND MINING DISTRICT.

Drake	1,075 0 0	.....	2,875 17 0	3,450 17 0	11,263 13 0	90	11	44	145	26,150
Tenterfield	70 0 0	.....	.....	70 0 0	251 0 0	10	1	12	23	.....
Wilson's Downfall .....	.....	.....	.....	.....	.....	...	...	6	6	.....
	1,145 0 0	.....	2,875 17 0	3,520 17 0	11,514 13 0	100	12	62	174	26,150

Mining Registrar's Division.	Quantity of Gold won.				Value of Gold won.	Number of Men employed.				Estimated Value of Machinery and Plant at the Gold-mines, and also Gold-dredging Plants.
	Alluvial.		Quartz.	Total.		Alluvial.		Quartz.	Total.	
	Other than by Dredging.	By Dredging.				European.	Chinese.			
PEEL AND URALLA MINING DISTRICT.										
	oz. dwt. grs.	oz. dwt. grs.	oz. dwt. grs.	oz. dwt. grs.	£	s.	d.			£
Armidale .....	.....	.....	120 0 0	120 0 0	454	15	0	...	...	1,570
Barraba	63 0 0	.....	171 0 0	234 0 0	915	0	0	6	...	605
Bendemeer	24 0 0	.....	.....	24 0 0	90	0	0	12	...	.....
Bingara	275 0 0	.....	125 0 0	400 0 0	1,260	0	0	30	2	35
Glen Innes .....	.....	506 0 0	.....	506 0 0	1,544	0	0	9	...	9
Hillgrove .....	.....	.....	13,591 1 0	13,591 1 0	46,964	12	3	...	...	66,300
Kookabookra.....	170 0 0	10 0 0	.....	180 0 0	675	0	0	60	24	96
Metz .....	.....	.....	1,153 0 0	1,158 0 0	4,095	0	0	...	...	400
Moonan Brook	49 0 0	.....	422 0 0	471 0 0	1,679	10	0	9	...	22,450
Nowendoc	24 0 0	.....	.....	24 0 0	84	0	0	5	...	84
Nundle	1,066 0 0	.....	818 0 0	1,884 0 0	7,017	18	0	100	30	900
Stewart's Brook .....	.....	.....	3,37 10 0	3,37 10 0	1,358	5	0	...	...	5
Swamp Oak	146 14 0	.....	.....	146 14 0	502	6	0	12	...	.....
Tamworth	160 0 0	.....	.....	160 0 0	600	0	0	25	...	3,000
Uralla	892 0 0	1,275 0 0	.....	2,167 0 0	1,358	5	0	...	...	6,000
Walcha .....	.....	.....	.....*	.....	502	6	0	12	...	47
					600	0	0	25	...	4,500
					8,298	16	0	179	20	29
								10	...	.....
									
									
									
									
									
									
									
									
									
									
									
									
									
									
									
									
									
									
									
									
									
									
									
									
									
									
									
									
									
									
									
									
									
									
									
									
									
									
									
									
									
									
									
									
									
									
									
									
									
									
									
									
									
									
									
									
									
									
									
									
									
									
									
									
									
									
									
									
									
									
									
									
									
									
									
									
									
				</						

* Prospecting only.

SOUTHERN MINING DISTRICT.										
Araluen	676 0 0	11,704 0 0	.....	12,380 0 0	47,695 0 0	240	22	...	262	76,493
Bateman's Bay	50 0 0	.....	17 0 0	67 0 0	268 0 0	25	...	10	35	4,350
Bega	50 0 0	.....	.....	50 0 0	193 0 0	15	...	...	15	.....
Bombala .....	.....	.....	.....	*	.....	6	...	...	6	.....
Braidwood .....	.....	660 0 0	.....	660 0 0	2,580 0 0	23	...	8	36	7,740
Burrowa .....	.....	28 0 0	.....	28 0 0	109 0 0	12	...	6	18	2,000
Cobargo	20 0 0	.....	.....	20 0 0	75 0 0	6	5	...	11	200
Delagate	10 0 0	.....	80 0 0	90 0 0	335 16 0	...	10	5	15	500
Frogmoor .....	.....	.....	24 0 0	24 0 0	94 0 0	...	...	10	10	700
Gunning .....	.....	.....	.....	*	.....	7	...	...	7	.....
Goulburn	466 0 0	.....	.....	466 0 0	1,820 14 0	70	...	10	80	.....
Little River	440 3 20	1,265 2 2	.....	1,700 5 22	6,573 16 11	80	30	18	123	30,795
Major's Creek	584 0 0	.....	1,074 0 0	1,658 0 0	6,365 0 0	45	2	43	90	14,610
Milton .....	.....	.....	.....	*	.....	4	...	...	4	.....
Moruya .....	.....	.....	894 0 0	894 0 0	3,520 0 0	10	...	40	50	2,799
Nelligen .....	.....	.....	22 0 0	22 0 0	88 0 0	5	...	7	12	450
Nerriga	100 0 0	543 15 0	39 0 0	682 15 0	2,741 12 0	115	...	10	125	10,000
Nerrigundah	450 0 0	.....	1,214 7 0	1,664 7 0	6,782 4 6	50	30	95	175	4,850
Norwa .....	.....	.....	2,952 0 0	2,952 0 0	10,319 0 0	...	...	98	98	34,500
Pambula .....	.....	.....	511 0 0	511 0 0	1,768 0 7	5	...	56	61	8,500
Pieton	10 0 0	.....	174 0 0	181 0 0	727 3 0	...	...	...	.....	.....
Wagonga	169 4 11	.....	1,044 0 11	1,213 4 22	4,172 18 9	40	15	75	130	5,430
Wolumla .....	.....	.....	24 0 0	24 0 0	98 0 0	...	...	40	40	2,500
Yambulla	45 0 0	.....	3,379 5 0	3,424 5 0	11,869 0 0	10	...	140	150	4,500
	3,070 8 7	14,204 17 2	11,448 12 11	28,723 17 20	108,195 5 9	773	114	671	1,558	210,917

* Prospecting only.

† Contained in silver ores.

TAMBAROORA AND TURON MINING DISTRICT.										
Hill End	1,558 0 17	.....	987 3 7	2,545 4 0	9,735 7 5	130	49	60	239	5,500
Rylstone	40 0 0	.....	.....	40 0 0	150 0 0	25	5	...	30	.....
Sofala	1,010 0 0	1,980 8 10	1,292 0 0	4,192 8 10	13,789 0 0	295	20	49	274	23,350
Stuart Town	1,583 0 0	2,789 0 0	584 0 0	4,956 0 0	19,218 0 0	217	30	100	377	65,745
	4,191 0 17	4,769 8 10	2,773 3 7	11,733 12 10	42,892 7 5	697	104	209	920	94,635

TUMUT AND ADELONG MINING DISTRICT.										
Adelong	659 3 11	147 0 0	8,093 8 0	8,869 11 11	34,156 15 6	50	30	300	380	67,000
Albury .....	.....	.....	89 0 0	89 0 0	320 0 0	10	...	10	20	150
Bungendore & Bywong .....	.....	.....	20 0 0	20 0 0	80 16 9	10	...	15	25	450
Captain's Flat .....	.....	.....	.....	*	.....	...	...	30	30	.....
Cooma	265 0 0	34 0 0	1,591 0 0	1,890 0 0	6,925 0 0	40	8	85	133	15,122
Corowa .....	.....	.....	.....	*	.....	25	...	...	25	9,500
Germanton .....	.....	.....	31 16 0	31 16 0	97 11 0	10	...	10	20	100
Gundaroo	40 0 0	.....	3 15 0	43 15 0	167 15 0	7	...	2	9	200
Kiandra	1,034 1 19	1,805 4 0	150 0 0	2,989 5 19	10,998 16 10	140	10	16	166	18,850
Qucanbeyan .....	.....	.....	.....	*	.....	10	4	25	39	.....
Reedy Flat (Batlow)	830 0 0	.....	31 0 0	861 0 0	3,340 0 0	40	...	...	40	1,620
Tooma	500 0 0	.....	34 4 0	534 4 0	2,114 11 0	25	...	2	27	350
Tumut	584 5 19	.....	250 0 0	834 5 19	3,206 8 11	10	...	20	20	5,007
Tumbarumba	2,500 0 0	403 0 0	.....	2,903 0 0	10,822 0 0	220	2	5	227	5,000
Walbundrie .....	.....	.....	47 6 0	47 6 0	160 12 0	...	...	6	6	400
Yass	218 0 0	.....	286 10 0	504 10 0	1,925 10 0	36	...	35	71	1,313
	6,630 11 1	2,389 4 0	10,657 19 0	19,677 14 1	74,285 17 0	633	54	561	1,248	125,062

* Prospecting only.

Summary of the foregoing tables, showing approximately the quantity and value of the gold won†, the number of miners employed in mining for gold, and the value of the machinery at the gold-mines, and also the gold-dredging plants in the State of New South Wales during 1901 :—

Mining Districts.	Quantity of Gold won.					Value of Gold won.		Number of Men employed.				Estimated Value of Machinery and Plant at the Gold-mines, and also Gold-dredging Plants.
	Alluvial.		Quartz.	Total.	Alluvial.			Quartz.	Total.			
	Other than by Dredging.	By Dredging.			European.					Chinese.		
	oz. dwts. grs.	oz. dwts. grs.	oz. dwts. grs.	oz. dwts. grs.	£	s.	d.					£
Albert	588 0 0	.....	.....	*960 12 0	3,842	8	0	75	3	18	96	2,300
Bathurst	9,471 19 18	425 0 0	12,712 10 0	22,607 9 18	81,041	5	11	936	54	1,084	2,074	107,600
Clarence and Richmond	467 0 0	.....	667 6 0	1,134 6 0	3,853	14	6	67	2	99	168	9,110
Cobar .....	.....	.....	43,167 0 0	43,167 0 0	148,681	0	0	...	...	644	644	152,535
Hunter and Macleay	40 10 0	.....	341 2 0	381 12 0	1,321	3	0	5	...	99	104	6,645
Lachlan	3,023 5 1	6 0 0	45,422 15 16	48,452 0 17	179,150	6	5	445	...	1,660	2,105	150,656
Mudgee	3,470 0 0	.....	13,458 0 0	16,958 0 0	63,303	4	1	838	54	868	1,760	61,130
New England	1,145 0 0	.....	2,375 17 0	3,520 17 0	11,514	13	0	100	12	62	174	26,150
Peel and Uralla	2,869 14 0	1,791 0 0	16,802 11 0	21,463 5 0	75,539	2	3	457	76	680	1,213	133,325
Southern	3,070 8 7	14,204 17 2	11,448 12 11	28,723 17 20	108,195	5	9	773	114	671	1,558	210,917
Tambaroora and Turon	4,191 0 17	4,769 8 10	2,773 3 7	11,733 12 10	42,892	7	5	607	104	209	920	94,635
Tumut and Adelong...	6,630 11 1	2,389 4 0	10,657 19 0	19,677 14 1	74,285	17	0	633	54	561	1,248	125,062
Totals.....	34,967 8 20	23,585 9 12	159,836 16 10	218,762 6 18*	793,620	7	4	4,936	473	6,655	12,064	1,080,065

* Includes 372 oz. 12 dwts. contained in Broken Hill silver ores.

† These particulars are based on information obtained locally, and on reference to page 10 it will be seen that the Mining Registrars have underestimated the output by some 48,299 ounces.

COAL.

The most gratifying feature in connection with the mining industry during the year was the sustained activity in the coal trade.

The quantity of coal raised during the year was 5,968,426 tons, valued at £2,178,929 4s. 9d., being an increase of 460,929 tons and £510,018 1s. 2d. in value over the previous year, and is the largest output yet recorded.

The importance of our extensive and accessible coalfields is being emphasised by the direct bearing they are likely to have on the establishment here of large manufacturing and other industries, and the possession of these vast stores of fuel will, undoubtedly, prove one of the greatest factors in the future prosperity of the State.

The output of coal from the Northern District shows an increase of 72,668 tons over that of the previous year. The increase would, doubtless, have been greater but for the decline in the deep-sea trade to the west coast of America, as owing to this many of the collieries were not so actively worked during the latter half of the year.

The Southern District shows an increase in the output of 279,399 tons over that of 1900. The trade in this district was well maintained and the pits were kept continuously working during the whole year.

The output of the Western District shows an increase of 108,862 tons over that of the previous year, and the production would, the owners affirm, have been much larger if better trucking facilities had been available to get the coal to the seaboard.

The following table shows the quantity and value of coal raised from the opening of the coal-seams to 1857, inclusive :—

Year.	Quantity.	Average per ton.	Value.	Year.	Quantity.	Average per ton.	Value.
		£ s. d.	£			£ s. d.	£
Prior to 1829	50,000	0 10 0·00	25,000	1844.....	23,118	0 10 8·34	12,363
1829.....	780	0 10 1·23	394	1845.....	22,324	0 7 10·27	8,769
1830.....	4,000	0 9 0·00	1,800	1846.....	38,965	0 7 0·46	13,714
1831.....	5,000	0 8 0·00	2,000	1847.....	40,732	0 6 9·01	13,750
1832.....	7,143	0 7 0·00	2,500	1848.....	45,447	0 6 3·38	14,275
1833.....	6,812	0 7 6·73	2,575	1849.....	48,516	0 6 0·45	14,647
1834.....	8,490	0 8 10·00	3,750	1850.....	71,216	0 6 6·77	23,375
1835.....	12,392	0 8 10·19	5,483	1851.....	67,610	0 7 6·51	25,546
1836.....	12,646	0 9 1·06	5,747	1852.....	67,404	0 10 11·33	36,885
1837.....	16,083	0 9 8·81	7,828	1853.....	96,809	0 16 1·51	78,059
1838.....	17,220	0 9 9·05	8,399	1854.....	116,642	1 0 5·63	119,380
1839.....	21,283	0 9 9·73	10,441	1855.....	137,076	0 12 11·96	89,082
1840.....	30,256	0 10 10·86	16,498	1856.....	189,960	0 12 4·06	117,906
1841.....	34,841	0 12 0·00	20,905	1857.....	210,434	0 14 0·97	148,158
1842.....	39,900	0 12 0·00	23,940				
1843.....	25,862	0 12 6·54	16,222		1,468,961	0 11 10·04	869,391



THE WORKING FACE, PELAW MAIN COLLIERY, WEST MAITLAND.

(The Seam of clean Coal is 17 feet thick, of which 9 feet of bottom portion is now being worked.)

The following table shows the Quantities and Average Value per ton of Coal exported to Australasian and other Ports respectively, the Quantity of Coal consumed in this State, and the Average Price per ton of the total output of the Collieries, from the opening of the Coal-seams to 1901 inclusive.

Year.	Exports to Australasian Ports.			Exports to Other Ports.			Total Exports.			Home consumption.	Total Output and Value.		
	Quantity.	Average per ton.	Value.	Quantity.	Average per ton.	Value.	Quantity.	Average per ton.	Value.		Quantity.	Average per ton.	Value.
To end of	tons.	£ s. d.	£	tons.	£ s. d.	£	tons.	£ s. d.	£	tons.	tons.	£ s. d.	£ s. d.
1857*	101,488	0 15 1-67	76,824	12,039	1 0 1-85	12,132	113,527	0 15 8-05	88,956	1,468,961†	1,468,961	0 11 10-04	869,391 0 0
1858	129,586	0 14 6-67	94,312	44,349	0 17 5-27	38,672	173,935	0 15 3-49	132,984	134,278	308,213	0 13 3-14	204,371 0 0
1859	140,183	0 14 10-85	104,471	93,694	0 16 11-10	79,290	233,877	0 15 8-57	183,761	134,985	368,862	0 12 3-36	226,493 0 0
1860	157,278	0 15 2-25	119,433	50,502	0 16 5-37	41,532	207,780	0 15 5-92	160,965	134,287	342,067	0 12 9-52	218,820 0 0
1861	195,427	0 15 0-55	147,019	113,355	0 17 4-34	98,403	308,782	0 15 10-75	245,422	167,740	476,522	0 12 9-73	305,234 0 0
1862	213,909	0 13 8-40	146,532	84,129	0 17 6-10	73,649	298,038	0 14 9-30	220,181	135,851	433,889	0 10 10-66	236,230 0 0
1863	283,539	0 10 3-74	146,199	88,927	0 14 10-90	66,289	372,466	0 11 4-91	212,488	176,546	549,012	0 9 10-10	417,171 0 0
1864	292,664	0 9 11-83	146,129	90,304	0 15 0-79	63,029	382,968	0 11 2-20	214,158	202,557	585,525	0 9 4-43	274,303 0 0
1865	344,194	0 9 2-98	159,175	196,711	0 14 4-53	141,413	540,905	0 11 1-37	300,588	233,333	774,238	0 8 4-44	324,049 0 0
1866	312,101	0 9 4-35	146,111	161,256	0 13 3-47	107,148	473,357	0 10 8-40	253,259	296,655	770,012	0 8 10-79	342,655 0 0
1867	329,052	0 9 5-76	155,975	218,984	0 12 5-29	136,256	548,036	0 10 7-96	292,201	406,195	954,231	0 8 9-08	417,809 0 0
1868	340,466	0 8 9-07	149,059	255,087	0 11 8-31	149,136	595,553	0 10 0-16	293,195	324,221	919,774	0 7 6-32	346,146 0 0
1869	335,564	0 8 6-02	142,656	242,825	0 10 3-57	125,025	578,389	0 9 3-07	267,681	290,175	868,564	0 7 3-54	316,836 0 0
1870	378,891	0 8 6-91	162,470	186,538	0 10 1-22	94,220	565,429	0 9 0-95	256,690	333,355	898,784	0 7 0-47	316,240 0 0
1871	394,052	0 8 8-11	170,947	275,058	0 9 11-46	136,914	669,110	0 9 2-42	307,861	343,316	1,012,426	0 7 9-92	396,198 0 0
1872	425,937	0 12 9-32	272,110	347,142	0 14 7-59	253,979	773,079	0 13 7-32	526,089	419,783	1,192,862	0 11 1-94	665,747 0 0
1873	467,533	0 13 8-30	320,119	405,442	0 15 4-76	312,123	873,025	0 14 5-81	632,247	431,557	1,304,612	0 12 1-37	790,224 0 0
1874	518,853	0 13 7-77	354,074	408,154	0 15 6-64	317,409	927,007	0 14 5-84	671,483	402,722	1,329,729	0 12 3-88	819,429 17 2
1875	542,952	0 13 8-45	372,045	325,865	0 15 6-45	253,166	868,817	0 14 4-70	625,211	451,101	1,319,918	0 12 2-06	803,300 5 6
1876	563,757	0 13 8-64	386,740	351,970	0 14 10-81	262,237	915,727	0 14 2-08	648,977	528,544	1,444,271	0 11 10-74	858,998 8 2
1877	623,323	0 13 8-77	427,954	383,097	0 14 7-69	283,452	1,006,420	0 14 0-93	708,406	569,077	1,575,497	0 11 8-28	920,936 7 4
1878	621,087	0 13 6-75	421,198	376,962	0 14 6-13	273,509	998,049	0 13 11-05	694,707	585,332	1,583,381	0 12 0-12	950,878 18 3
1879	550,672	0 11 2-67	309,004	202,684	0 11 5-70	116,295	753,356	0 11 3-48	425,290	712,824	1,466,180	0 8 6-36	619,336 11 7
1880	657,135	0 7 9-34	255,572	372,709	0 8 8-29	161,958	1,029,844	0 8 1-30	417,530	739,753	1,769,597	0 6 9-55	603,248 5 8
1881	760,226	0 9 9-54	372,334	501,319	0 10 11-50	274,099	1,261,545	0 10 3-09	647,033	847,737	2,109,282	0 8 11-97	943,965 0 0
1882	855,704	0 10 5-75	448,356	656,741	0 11 7-34	381,306	1,512,445	0 10 11-65	829,662	1,009,012	2,521,457	0 9 6-40	1,201,941 12 11
1883	991,924	0 10 8-66	532,938	696,676	0 11 5-14	398,107	1,690,763	0 11 0-15	931,045	1,058,346	2,749,109	0 9 5-71	1,303,076 19 11
1884	1,027,775	0 10 7-22	544,824	708,090	0 11 4-31	402,178	1,735,865	0 10 10-93	947,002	1,094,310	2,830,175	0 9 2-53	1,303,164 4 1
1885	1,077,270	0 10 5-89	565,084	713,172	0 11 1-08	395,455	1,790,442	0 10 8-75	960,539	1,132,055	2,922,497	0 9 2-57	1,346,440 2 7
1886	1,039,764	0 10 10-25	564,293	834,108	0 11 3-98	500,179	1,923,872	0 11 0-78	1,064,472	1,279,572	3,203,444	0 9 1-02	1,455,198 4 1
1887	1,310,228	0 10 4-24	678,200	1,077,474	0 11 1-88	601,071	2,387,702	0 10 8-58	1,279,271	1,267,930	3,655,632	0 8 11-20	1,632,848 15 6
1888	1,149,544	0 10 6-96	608,108	672,330	0 11 3-31	379,065	1,821,874	0 10 10-04	987,173	1,239,002	3,060,876	0 8 4-20	1,279,088 19 5
1889	1,397,256	0 10 0-30	700,330	847,473	0 10 10-43	460,595	2,244,729	0 10 4-12	1,160,975	1,793,200	4,037,929	0 8 7-58	1,742,795 12 6
1890	1,318,008	0 8 10-89	587,016	873,697	0 10 1-24	441,379	2,191,705	0 9 4-61	1,023,395	1,589,263	3,780,968	0 7 8-82	1,462,388 9 4
1891	1,160,238	0 8 6-05	493,372	674,852	0 9 6-35	321,557	1,835,090	0 8 10-57	814,929	1,443,238	3,278,968	0 7 1-78	1,171,722 4 6
1892	1,175,072	0 7 1-73	419,751	950,953	0 8 1-26	385,018	2,125,125	0 7 6-88	804,769	1,546,951	3,672,076	0 6 3-53	1,155,573 7 10
1893	1,196,504	0 6 9-69	407,271	969,726	0 7 6-75	366,683	2,166,220	0 7 1-74	773,954	1,572,359	3,738,589	0 5 10-31	1,095,327 1 0
1894	1,371,796	0 7 0-34	432,096	1,103,111	0 7 6-98	418,168	2,474,967	0 7 3-30	900,264	1,434,610	3,909,517	0 5 9-08	1,125,280 16 7
1895	1,498,992	0 6 11-49	521,462	1,197,631	0 7 2-20	430,592	2,696,623	0 7 0-73	932,054	1,686,968	4,383,591	0 5 7-34	1,230,041 1 1
1896	1,629,072	0 6 9-19	551,033	1,162,724	0 7 0-96	411,585	2,791,796	0 6 10-76	962,668	1,914,455	4,706,251	0 5 4-86	1,271,832 11 0
1897	1,624,137	0 6 9-81	553,629	1,174,386	0 7 8-40	452,165	2,793,523	0 7 2-26	1,005,794	1,798,505	4,597,028	0 5 9-22	1,325,798 12 5
1898	1,978,580	0 7 2-92	716,585	1,390,752	0 8 0-03	556,449	3,369,332	0 7 6-68	1,273,034	2,138,165	5,507,497	0 6 0-72	1,668,911 3 7
1899	2,119,538	0 9 3-10	951,139	1,351,447	0 10 4-43	700,685	3,470,935	0 9 8-29	1,631,824	2,497,441	5,968,426	0 7 3-62	2,178,929 4 9
1900	34,595,408	0 9 6-05	16,439,492	23,657,977	0 10 4-95	12,317,367	58,253,385	0 9 10-43	28,756,859	39,191,674	97,445,059	0 8 1-27	39,494,844 10 4

This comparative Statement shows the Average Price of Coal per ton in the Northern, Western, and Southern Districts during the five years 1897-1901; and also the increase or decrease as compared with the previous year.

	Northern District.	Western District.	Southern District.		Northern District.	Western District.	Southern District.
	s. d.	s. d.	s. d.		s. d.	s. d.	s. d.
Average price per ton in 1897 ...	5 10-92	4 0-94	5 0-74	Average price per ton in 1900 ...	6 4-16	4 11-33	5 5-42
Increase on previous year ...	.....	0 0-07	.....	Increase on previous year ..	0 2-13	0 9-25	0 6-48
Decrease on previous year ..	0 2-54	.....	0 2-50	Decrease on previous year ..	.....	.....	.....
Average price per ton in 1898 ...	5 8-48	4 2-71	4 9-21	Average price per ton in 1901 ...	5 8-49	4 9-76	5 3-28
Increase on previous year ...	.....	0 1-77	.....	Increase on previous year ...	2 0-03	.....	.....
Decrease on previous year ...	0 2-44	.....	0 3-53	Decrease on previous year ...	.....	0 1-57	0 2-14
Average price per ton in 1899 ..	6 2-03	4 2-08	4 10-94				
Increase on previous year ...	0 5-55	.....	0 1-73				
Decrease on previous year ...	.....	0 0-63	.....			

* For details, see preceding table.

† This item includes also all exports prior to 1858.

Comparative Statement of the Output and Value of Coal raised in the Northern, Western, and Southern Districts during the ten years, 1892-1901, showing the increase or decrease as compared with the previous year:—

	Northern District.						Western District.						Southern District.					
	Quantity.			Value.			Quantity.			Value.			Quantity.			Value.		
	tons	cwt.	qr.	£	s.	d.	tons	cwt.	qr.	£	s.	d.	tons	cwt.	qr.	£	s.	d.
Output for 1892	2,611,731	13	0	1,102,694	14	5	236,363	1	0	57,414	13	8	932,873	0	1	302,279	1	3
Increase on previous year .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	95,000	0	1	.....	.....	.....
Decrease do	241,529	0	1	251,333	13	3	110,441	12	0	16,689	4	2	.....	.....	.....	12,333	0	9
Output for 1893	2,203,480	10	0	880,218	4	3	190,377	19	1	43,241	14	5	884,469	18	0	243,262	5	10
Increase on previous year .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Decrease do	408,251	3	0	222,476	10	2	45,935	1	3	14,172	19	3	48,403	2	1	54,016	15	5
Output for 1894	2,605,142	13	1	883,174	14	7	199,869	12	0	45,463	0	7	837,063	19	0	226,935	12	8
Increase on previous year	401,662	3	1	2,956	10	4	9,491	12	3	2,221	6	2	.....	.....	.....	.....	.....	.....
Decrease do .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	17,445	19	0	21,326	13	2
Output for 1895	2,631,221	11	0	813,227	15	6	193,864	14	1	40,260	15	3	916,502	15	0	241,838	10	3
Increase on previous year	26,078	17	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	49,438	16	0	14,902	17	7
Decrease do .....	.....	.....	.....	69,946	19	1	9,044	17	3	5,202	5	4	.....	.....	.....	.....	.....	.....
Output for 1896	2,623,015	14	2	892,956	1	0	278,124	8	0	56,638	1	8	1,008,376	10	0	265,686	13	11
Increase on previous year .....	.....	.....	.....	.....	.....	.....	87,259	13	3	16,377	6	5	91,873	15	0	23,848	3	8
Decrease do	8,205	16	2	10,271	14	6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Output for 1897	3,176,863	19	3	938,774	4	8	287,867	14	0	58,709	1	2	918,862	2	0	232,557	15	3
Increase on previous year	553,853	5	1	135,818	3	8	9,736	6	0	2,070	19	6	.....	.....	.....	.....	.....	.....
Decrease do .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	89,514	8	0	33,128	18	8
Output for 1898	3,355,600	0	0	957,505	17	4	282,234	0	0	59,639	7	11	1,068,367	0	0	254,687	5	9
Increase on previous year	178,731	0	1	18,731	12	8	.....	.....	.....	930	6	9	149,504	18	0	22,129	10	6
Decrease do .....	.....	.....	.....	.....	.....	.....	5,576	14	0	.....	.....	.....	.....	.....	.....	.....	.....	.....
Output for 1899	3,259,708	0	0	1,005,420	2	1	217,817	0	0	45,455	8	11	1,119,503	0	0	274,923	2	3
Increase on previous year .....	.....	.....	.....	47,914	4	9	.....	.....	.....	.....	.....	.....	51,136	0	0	20,235	16	6
Decrease do	95,892	0	0	.....	.....	.....	64,467	0	0	14,183	19	10	.....	.....	.....	.....	.....	.....
Output for 1900	3,926,584	0	0	1,246,011	10	0	315,358	0	0	78,037	15	7	1,265,055	0	0	344,311	18	0
Increase on previous year	666,876	0	0	240,591	7	11	98,041	0	0	32,632	7	6	145,552	0	0	69,888	15	9
Decrease do .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Output for 1901	3,999,252	0	0	1,669,519	2	9	424,729	0	0	102,214	4	0	1,544,454	0	0	467,195	17	6
Increase on previous year	72,668	0	0	423,507	12	9	108,862	0	0	24,123	8	11	279,399	0	0	62,583	19	6
Decrease do .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

The following Statement shows the output and value of the Coal from the various Collieries, and the number of persons employed during the year 1901 :—

Colliery.	District.	Persons Employed.							Total number of Persons.	Quantity.	Value.
		Under Ground.			Above Ground.						
		Boys under 16.	Males above 16.	Total.	Boys under 14.	Boys of 14, and under 16.	Males above 16.	Total.			

Northern District.

A. A. Company's No. 2	Newcastle ...	...	75	75	...	3	15	18	93	tons. 16,585	£ 6,420 s. 17 d. 4
A. A. Company's New Winning	"	7	480	487	...	9	119	128	615	362,922	147,786 18 6
Anvil Creek	Greta .....	...	47	47	...	1	10	11	58	12,155	4,340 4 0
Bloomfield	East Maitland	1	12	13	...	...	3	3	16	3,250	975 0 0
Brown's.....	Minmi	19	383	402	...	10	94	104	506	209,705	90,674 0 0
Burwood	Redhead .....	...	342	342	...	2	55	57	399	170,434	81,373 0 0
Cardiff	Cardiff .....	...	19	19	...	...	8	8	27	10,409	3,018 7 9
Centenary.....	Curlewis .....	...	23	23	...	1	3	4	27	11,665	5,000 0 0
Co-operative	Plattsburg.....	14	290	304	...	6	85	91	395	171,883	57,932 14 0
Duckenfield	Minmi	20	234	254	...	8	81	89	343	119,149	54,915 0 0
Dudley	Dudley	10	278	288	...	7	54	61	349	160,424	70,225 13 0
Dulwich	Singleton .....	...	8	8	...	...	2	2	10	3,420	1,448 0 0
East Greta	West Maitland	12	274	286	...	5	69	74	360	150,965	43,498 18 0
Ebbw-Vale	New Lambton .....	...	28	28	...	...	2	2	30	23,400	8,190 0 0
Electric	North Lambton .....	...	1	1	...	...	1	1	2	67	2 2 0
Elmore Vale	Wallsend	9	63	102	...	4	6	10	112	51,500	13,032 3 7
Fraser's Creek	Inverell .....	...	5	5	...	...	2	2	7	712	356 0 0
Granbalang	Singleton .....	...	5	5	...	2	7	9	14	1,543	733 8 0
Greta	Greta .....	...	...	...	(Mine not working in consequence of an underground fire.)						
Gunnedah.....	Gunnedah.....	...	23	28	...	...	13	13	41	16,334	6,533 10 7
Hanbury	Waratah .....	...	3	3	...	1	1	2	5	113	39 11 0
Hectorville	Awaba .....	...	4	4	...	...	3	3	7	12	4 4 0
Heddon Greta	West Maitland .....	...	16	16	...	...	26	26	42	1,000	380 0 0
Hetton	Carrington ...	12	353	365	...	3	65	68	433	178,303	80,845 0 0
Hillside	Merewether .....	...	9	9	...	1	...	1	10	5,750	1,551 0 0
Kayuga	Muswellbrook.....	...	1	1	...	...	1	1	2	758	237 8 11
Killingworth	West Wall-end	1	170	171	...	18	34	52	223	74,222	32,053 6 6
Kimberley	East Maitland .....	...	6	6	...	1	1	2	8	2,532	633 0 0
Ladysmith .....	" .....	...	1	1	(Prospecting only)				1	.....	.....
Lambton	Lambton	2	155	157	...	4	45	49	206	80,945	41,437 0 0
Lambton B or No. 2	Charlestown .....	...	66	66	...	1	21	22	88	33,714	16,348 0 0
Leconfield	Branxton .....	...	2	2	...	...	1	1	3	100	50 0 0
Mafeking	New Lambton .....	...	1	1	...	...	2	2	3	36	9 2 0
Maryland	Plattsburg.....	2	36	38	...	...	8	8	46	3,470	10,155 12 0
Morley	Gunnedah .....	...	1	1	...	...	...	...	1	8	1 17 6
Morrisset	Lake Macquarie .....	...	8	8	...	...	...	...	8	5,260	1,316 0 0
Newcastle A	Merewether ...	2	328	330	...	28	93	121	451	} 370,167	171,752 13 11
" B	"	1	319	320	...	9	81	90	410		
New Greta	Greta.....	...	2	2	...	...	1	1	3	14	5 5 0
New Lambton	New Lambton .....	...	70	70	...	3	23	26	66	30,240	13,608 0 0
New Park	Singleton .....	...	24	34	...	4	35	39	73	2,381	12,952 15 6
Northern Extended.....	Teralba	3	60	63	...	2	11	13	106	82,673	24,801 0 0
Northumberland	Fassfern .....	...	14	14	...	...	7	7	21	14,024	5,380 17 0
Oakvale	Singleton .....	...	4	4	...	2	1	3	7	1,022	333 5 0
Pacific	Teralba	6	171	177	...	5	29	34	211	123,379	47,693 0 0
Pelaw Main	West Maitland .....	...	46	46	...	...	27	27	73	5,004	2,085 0 0
Redhill	Waratah .....	...	2	2	...	...	1	1	3	639	193 5 0
Rhondda	Teralba	4	120	124	...	6	24	30	154	54,057	10,143 3 9
Rosedale	Singleton .....	...	12	12	...	...	2	2	14	4,989	1,871 3 10
Rugby	Curlewis .....	...	...	...	...	...	...	...	...	...	...
Seaham	West Wallsend	8	368	376	...	5	67	72	448	255,052	116,540 0 0
Shortland	New Lambton .....	...	12	12	...	3	1	4	16	8,919	2,311 1 4
South Greta	West Maitland .....	...	40	40	...	...	10	10	50	17,000	6,375 0 0
South Hetton	Toronto .....	...	3	3	...	...	...	...	3	60	225 0 0
South Wallsend	Cardiff .....	...	18	18	...	1	6	7	25	5,674	1,631 2 7
Stanford Merthyr	West Maitland	1	35	36	...	...	36	36	72	4,760	1,337 8 0
Stockton	Stockton	7	352	359	...	3	77	80	439	184,479	89,379 14 0
Sydney Harbour	Balmain .....	...	30	30	...	...	21	21	51	(Sinking.)	
Teralba	Teralba .....	...	13	13	...	...	25	25	38	(Opening up.)	
Thornley	East Maitland .....	...	2	2	...	...	...	...	2	604	225 18 9
Wallarah	Catherine Hill Bay	11	220	231	...	1	50	51	232	118,875	64,440 0 0
Wallsend	Wallsend	28	585	613	...	9	122	131	744	320,086	129,632 0 0
Waratah	Charlestown.....	4	222	226	...	4	37	41	267	123,033	51,789 1 1
West Wallsend	West Wallsend	8	324	332	...	9	53	62	394	181,206	80,754 11 4
Wickham and Bullock Island	Carrington	4	167	171	...	2	39	41	212	127,725	62,012 15 6
Wright's	Waratah	1	1	2	...	...	...	...	2	140	32 2 6
Total .....	.....	197	7,061	7,258	...	183	1,716	1,899	9,157	3,999,252	1,669,519 2 9

Colliery.	District.	Persons Employed.								Quantity.	Value.
		Under Ground.			Above Ground.				Total number of Persons.		
		Boys under 16.	Males above 16.	Total.	Boys under 14.	Boys of 14, and under 16.	Males above 16.	Total.			
<i>Western District.</i>											
Black Diamond	Blackman's Flat .....	...	5	5	...	...	2	2	7	tons. 1,772	£ s. d. 531 14 9
Carlo's Gap	Piper's Flat .....	...	2	2	...	...	3	3	5	82	21 18 0
Carysfort	Lithgow .....	...	1	1	...	...	...	...	1	(Prospecting)	.....
Cobar Copper Smelting Works .....	" .....	...	19	19	...	...	3	3	22	27,036	4,055 0 0
Coorwull	Bowenfels .....	...	3	3	...	...	2	2	5	2,695	590 5 0
Eskbank Old Tunnel	Eskbank .....	...	20	20	...	...	2	2	22	19,000	3,800 0 0
Folly	Wallerawang .....	...	2	2	...	...	1	1	3	514	141 7 0
Hermitage	Lithgow .....	...	32	32	...	...	3	3	35	45,255	12,221 16 2
Ivanhoe	Pipers Flat .....	...	9	9	...	...	2	2	11	8,140	2,035 0 0
Irondale	Wallerawang .....	...	36	36	...	...	6	6	42	12,236	2,144 12 3
Katoomba	Katoomba .....	...	14	14	...	2	9	11	25	2,152	429 0 0
Lithgow Valley	Lithgow .....	...	71	71	...	1	8	9	80	97,793	27,266 6 7
Oakey Park .....	" .....	...	64	64	...	2	25	27	91	63,170	16,363 15 0
Retort	Hartley Vale...	...	9	9	...	...	2	2	11	5,903	1,623 6 0
South Bowenfels	Bowenfels .....	...	1	1	...	...	1	1	2	242	72 10 0
Vale of Clwydd	Lithgow .....	...	77	77	...	2	11	13	90	69,275	18,184 13 9
Zig Zag	"	3	72	75	...	2	6	8	83	69,452	12,733 0 0
Total .....	.....	3	437	440	...	9	86	95	535	424,720	£ 102,214 4 6

Southern District.

Bellambi	Bellambi	1	100	101	...	...	24	24	125	£3,128	19,207 13 0
Bulli	Bulli	2	151	153	...	2	86	88	241	120,184	45,069 0 0
Bulli Pass	"	3	26	29	...	...	13	13	42	12,334	4,933 12 0
Coal Cliff	Clifton	2	16	18	...	...	9	9	27	10,434	2,785 18 0
Collins	Exeter .....	...	7	7	...	...	5	5	12	3,700	1,390 0 0
Corrimal	Corrimal	6	214	220	...	4	36	40	260	162,432	33,934 0 0
Metropolitan	Helensburgh	19	361	380	...	2	83	85	465	287,035	93,236 14 0
Mount Kembla	Mount Kembla	7	246	253	...	3	84	87	340	261,350	66,324 0 0
Mount Pleasant	Wollongong	6	145	151	...	4	40	44	195	122,530	33,389 0 0
Osborne Wallsend	"	1	201	202	...	3	53	56	258	145,593	40,244 3 6
Port Kembla .....	" .....	...	2	2	...	...	2	2	4	128	46 17 0
South Bulli	Bulli	25	264	289	...	3	70	73	362	246,364	47,220 0 0
South Clifton	Clifton	2	139	141	...	...	27	27	163	79,191	19,365 0 0
Total .....	.....	74	1,872	1,946	...	21	532	553	2,499	1,544,454	£ 407,195 17 6

COKE.

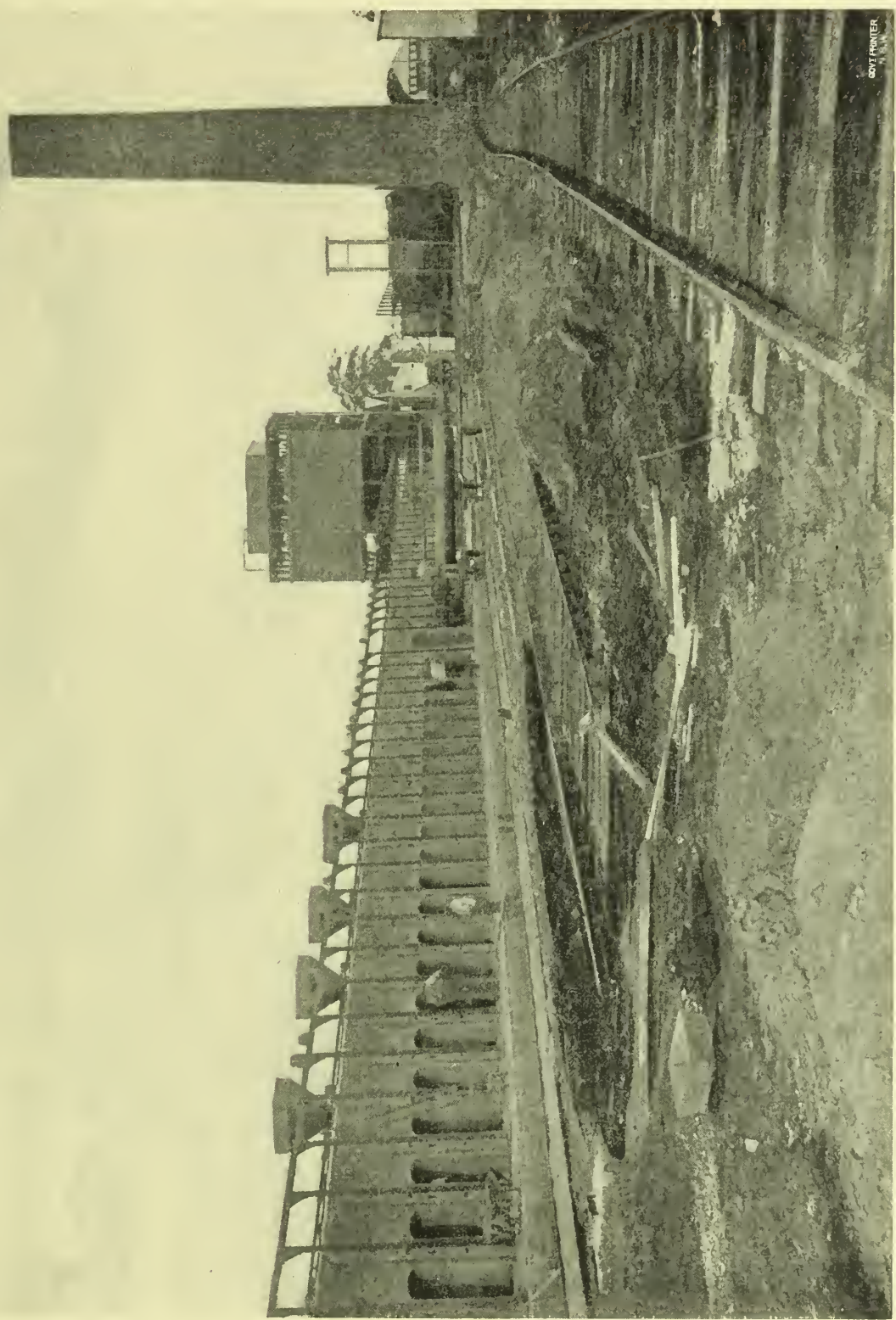
The following statement shows the production of coke for the years 1900 and 1901:—

	1900.		1901.	
	Quantity.	Value (at ovens).	Quantity.	Value (at ovens).
		£ s. d.		£ s. d.
Northern District	49,374 tons.	48,814 2 6	35,939 tons.	37,841 0 6
Southern and Western Districts	76,839 „	60,806 0 0	92,943 „	67,824 0 0
Totals	126,213 „	109,620 2 6	128,882 „	105,665 0 6

The output for the year 1901 shows an increase of 2,669 tons but a decrease of £3,955 2s. in value as compared with the previous year. Owing to the fall in the price of metals the demand for coke was comparatively much smaller than in the previous year, consequently some of the coke ovens closed down and the output was thereby restricted.

A considerable number of coking plants have been erected during the last two years, and on a recovery of the metal market a continuous output can be maintained and all demands promptly met.

The



COKE OVENS OF THE BROKEN HILL PROPRIETARY COMPANY, LIMITED, AT BELLAMBI.

The following Table shows the Quantity and Value of Coke made in the State of New South Wales to the end of 1901:—

Year.	Quantity.		Total.	Value.	
	Northern District.	Southern and Western Districts.		Total.	Per Ton.
	tons cwt.	tons cwt.	tons cwt.	£ s. d.	£ s. d.
1890	15,886 2	15,211 0	31,097 2	41,147 3 7	1 6 5
1891	9,474 2	20,836 5	30,310 7	34,473 5 10	1 2 9
1892	5,245 0	2,654 0	7,899 0	8,852 8 6	1 2 5
1893	12,262 0	5,596 0	17,858 0	20,223 2 0	1 2 8
1894	13,602 5	20,855 19	34,458 4	33,209 5 7	0 19 3
1895	11,326 8	16,304 0	27,630 8	24,683 5 0	0 17 10
1896	10,398 10	15,953 0	26,351 10	21,850 16 3	0 16 7
1897	21,012 0	43,190 0	64,202 0	45,391 18 0	0 14 1
1898	34,422 0	47,800 0	82,222 0	64,134 17 0	0 15 7
1899	43,912 0	52,618 0	96,530 0	77,129 10 1	0 16 0
1900	49,374 0	76,839 0	126,213 0	109,620 2 6	0 17 4
1901	35,939 0	92,943 0	128,882 0	105,665 0 6	0 16 5
Totals	262,853 7	410,860 4	673,653 11	585,390 14 10	0 17 5

KEROSENE SHALE.

The quantity and value of the Kerosene Shale wrought in the two districts from which it was produced during the years 1900 and 1901 were as follows:—

	Western Division.		South-western Division.	
	Tons.	Value.	Tons.	Value.
		£ s. d.		£ s. d.
1900	21,366	19,444 13 0	966	1,207 0 0
1901	54,363	40,935 6 0	411	554 0 0

The total production for the year 1901 was 54,774 tons valued at £41,489 6s. as compared with 22,862 tons valued at £20,651 13s. for the previous year, being an increase of 31,912 tons and £20,837 13s. in value.

The augmented output is due to two causes—increased activity in the export trade, and enlarged local consumption owing to the completion of a bench of modern retorts at Torbane for the treatment of the “seconds” and lower grade shale from the New Hartley mine. These retorts have been run continuously since their establishment, and in connection therewith a new and important development has taken place in the shape of the recovery of a commercial proportion of ammonia from the nitrogenous constituents of the lower grade shale, which in the higher grades are less pronounced. The ammoniacal water from the retorts is reduced to a commercial bulk in a still specially erected at Torbane, whence it is dispatched to the works of the Ammonia Company of Australia, at Clyde, for the preparation of anhydrous ammonia.

In connection with the crude-oil contract entered into between the New South Wales Shale and Oil Company and the Australian Gas-Light Company, the “once-run” oil from the Torbane retorts is conveyed to the Torbane siding by the Company’s railway, thence by the Great Western Railway to Little Hartley, where it is discharged into smaller tanks and conveyed by tram to the Company’s refinery at Hartley Vale. After purification, and extraction of the paraffin, the “crude-oil” is dispatched to the Gas Company in Sydney. The extracted paraffin is locally worked up into candles, &c.

At Hartley Vale retorts have been kept running on inferior bottoms, or “seconds,” and a smaller proportion of high-grade shale from pillars left in the early workings. The lighter oils from these retorts are added to the Torbane oil, with the object of making it flow more freely, and to facilitate treatment in the refinery.

The dangers and difficulties of shale-mining at Genowlan and New Hartley are accentuated, owing chiefly to the “shooting” or “splitting” of the shale, arising from the increasing pressure of the heavy cover as the sandstone mountain is pierced, and only careful and experienced miners are competent for this class of mining.

Shale of exceedingly high quality, averaging 85 per cent. of volatile hydro-carbon, is still being raised in small quantity by the Australian Kerosene Oil and Mineral Company at Joadja. Mining is, however, very costly, owing to the absence of either top or bottom holing.

The venture of the Mornington Shale Proprietary Company at the southern extension of the Cumber Melon Range, about 3 miles from Mornington (late Ilford) Railway Station, has, unfortunately for the district, proved unsuccessful. The retort erected on a new principle for the treatment of the shale failed to realise expectations, and operations have, apparently, been entirely suspended.

Prospecting has continued during the year in the Glen Alice Shale and Oil Company's leases with very satisfactory developments. On the south side of the Capertee River the continuation of that portion of the Gullies Seam opened by the Capertee Shale and Oil Company has been proved in the Glen Alice Company's ground with undiminished thickness. For the proper development of these properties capital is requisite, a tramway of considerable length being necessary for conveyance of the shale and products to the nearest approachable point of the Great Western Railway; and the prospects are sufficiently promising to warrant the belief that the necessary capital will be provided at an early date.

The following Statement shows the Output of Kerosene Shale from the respective Mines, and the number of persons employed during the year 1901 :—

Mine.	District.	Persons Employed.							Quantity.	Value.	
		Under Ground.			Above Ground.						Total number of Persons.
		Boys under 16.	Males above 16.	Total.	Boys under 14.	Boys of 14, and under 16.	Males above 16.	Total.			

Western District.

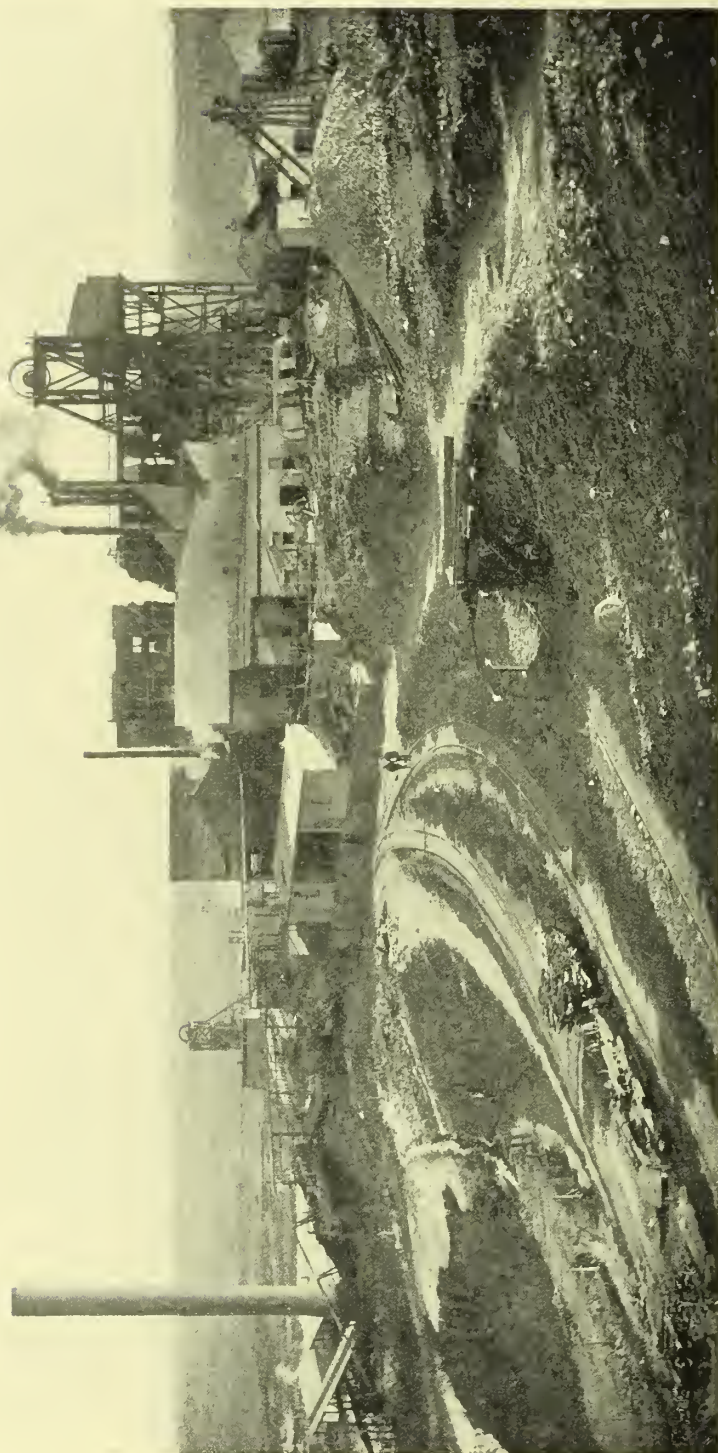
										tons.	£	s.	d.
Genowlan	Capertee	1	33	34	...	1	10	11	45	8,736	9,508	0	0
Hartley Vale ...	Hartley .....	...	8	8	...	...	5	5	13	6,583	1,766	6	0
New Hartley.....	Capertee .....	...	88	88	...	6	52	58	116	39,044	29,631	0	0
Total		1	129	130	...	7	67	74	204	54,363	40,535	6	0

Southern District.

										tons.	£	s.	d.
Joadja	Mittagong .....	...	18	18	...	...	2	2	20	411	554	0	0
Total .....		...	18	18	...	...	2	2	20	411	554	0	0
Total for all Mines		1	147	148	...	7	69	76	224	54,774	41,439	6	0

The following table shows the quantity and value of Kerosene Shale produced during the years 1865 to 1901 :—

Year.	Quantity.	Average price per ton.	Total Value.	Year.	Quantity.	Average price per ton.	Total Value.
	tons.	£ s. d.	£ s. d.		tons.	£ s. d.	£ s. d.
1865	570	4 2 5·47	2,350 0 0	1885	27,462	2 8 11·62	67,239 0 0
1866	2,770	2 18 10·48	8,150 0 0	1886	43,563	2 5 10·79	99,976 0 0
1867	4,079	3 14 9·21	15,249 0 0	1887	40,010	2 3 10·43	87,761 0 0
1868	16,952	2 17 7·11	48,816 0 0	1888	34,869	2 2 2·66	73,612 0 0
1869	7,500	2 10 0·00	18,750 0 0	1889	40,561	1 18 3·55	77,666 15 0
1870	8,580	3 4 3·18	27,570 0 0	1890	56,010	1 17 2·07	104,103 7 6
1871	14,700	2 6 3·91	34,050 0 0	1891	40,349	1 18 8·77	78,160 0 0
1872	11,040	2 11 11·91	28,700 0 0	1892	74,197	1 16 8·16	136,079 6 0
1873	17,850	2 16 6·55	50,475 0 0	1893	55,660	1 16 4·44	101,220 10 0
1874	12,100	2 5 1·48	27,300 0 0	1894	21,171	1 10 0·28	31,781 5 0
1875	6,197	2 10 2·22	15,500 0 0	1895	59,426	1 5 3·78	75,218 18 8
1876	15,998	3 0 0·00	47,994 0 0	1896	31,839	1 1 5·81	34,201 18 0
1877	18,963	2 9 0·81	46,524 0 0	1897	34,090	1 3 9·91	40,611 15 0
1878	24,371	2 6 11·40	57,211 0 0	1898	29,659	1 1 5·34	31,834 0 0
1879	32,519	2 1 1·96	66,930 10 0	1899	36,719	1 2 2·83	40,823 5 0
1880	19,201	2 6 7·03	44,724 15 0	1900	22,862	0 18 0·73	20,651 13 0
1881	27,894	1 9 2·59	40,748 0 0	1901	54,774	0 15 1·79	41,489 6 0
1882	48,065	1 15 0·00	84,114 0 0				
1883	49,250	1 16 10·77	90,861 10 0				
1884	31,618	2 5 7·86	72,176 0 0		1,073,468	1 16 8·58	1,970,623 4 2



THE SOUTH MINE BROKEN HILL.

SILVER, LEAD, AND ZINC.

The following statement shows the estimated *net* value of these products for the years 1900 and 1901 :—

	1900.	1901.
Silver, Silver-Lead, and Ores	£2,694,117	£1,854,463
Lead (Pig, &c.)	139,146	100,501
Zinc (Concentrates)	44,187	4,057
Totals	£2,787,450	£1,959,021

There is thus a decrease of £828,429 in the value of the output, as compared with the year 1900.

The bulk of the production, as previously, is contributed by the Broken Hill mines. Operations on this field were greatly hampered during the first month or so of the year by the insufficiency of the water supply, and during the later months by the fall in the prices of silver and lead. The effect of the fall was so great as to practically cripple the industry, and cause the closing down of mine after mine, until only three of the principal mines were left working full-handed. This state of affairs naturally directed attention to the necessity of effecting economies in working, and also in the treatment of the ores; and such has been the measure of success in this direction that considerable benefit will, it is expected, eventually accrue to the industry.

Experiments have been carried out on a large scale for the desulphurisation of the slimes by roasting, and it is reported that the results have been entirely satisfactory. Arrangements are being made to commence extensive operations, and when it is considered that the slimes have been accumulating by thousands of tons for years past, the importance of the undertaking is apparent.

The Sulphide Corporation has a magnetic separating plant in operation, and is producing high-grade zinc concentrates from the old dump of middlings, whilst the Australian Metal Company has patented a very simple machine which is doing really good work. The zinc distillation plant at the Cockle Creek Works was also in course of completion towards the close of the year. The profitable extraction of the zinc contents of the products which have, perforce, hitherto been regarded as waste must have an important bearing on the future progress of the Broken Hill field.

Mining for silver has also been carried on at several other centres, and reference to the operations conducted during the year will be found in the accompanying notes.

From the returns furnished by the Managers of the Broken Hill mines it is estimated that the quantity of ore raised during the year was as follows:—

	Tons.
Oxidised Ore	137,341
Sulphide Ore	1,141,281
Total.....	1,278,622

No portion of the above was smelted or finally treated on the field, the ore, concentrates, &c., being despatched to the sea-board for smelting or shipment.

The following statement shows the estimated *gross* metallic contents of the *profitable* products of the Broken Hill field for the year 1901 :—

Description of Product.	Tonnage.	Estimate of Gross Contents.			
		Silver.	Lead.	Zinc.	Gold.
Sulphide Lead Concentrates—		oz.	tons.	tons.	oz.
1st Grade	233,925	6,286,057	131,175	21,134*	26·6
2nd Grade	7,774	173,480	3,432	762*	.....
3rd Grade	337	7,334	113	67*	.....
Zinc Concentrates	1,567	20,686	205	621	.....
Lead Carbonate	13,001	1,090,697	4,838	.....	346·0
Slimes	1,190	16,898	215	269	.....
Middlings	39,789	377,995	3,342	10,823	.....
Lead Sulphide (hand dressed)	594	35,793	194	.....	.....
Crude Smelting Ore	1,230	27,090	398	252*	.....
Dyscrasite	5	7,250	.....	.....	.....
Total.....	.....	8,043,250	145,912	36,928	372·6

* No value is received for the zinc contents of the Lead Concentrates or the crude ore.

In addition to the foregoing, the following products were unprofitable, and were either dumped on the surface or returned to the mine as filling :—

Description of Product.	Tonnage.	Estimate of Gross Contents.		
		Silver.	Lead.	Zinc.
		oz.	tons.	tons.
Slimes	57,216	828,106	9,754	11,353
Middlings	154,565	1,325,867	12,521	31,776
Tailings	492,959	3,214,925	25,757	89,451
Vanner Tailings	18,483	196,793	(88	4,329
Zinc Middlings	23,037	295,447	1,309	6,867
Total.....	.....	5,861,138	50,029	143,776

The estimated value on the field of the *gross* metallic contents of the profitable products of the Broken Hill Mines for the year 1901 is as follows :—

	£
Silver	906,879
Lead	1,557,879
Zinc	198,780
Gold	1,490
Total	£2,665,028

The question of the gross value of the products is a most difficult one, and no degree of exactitude can be claimed for the above figures. It has been explained in previous reports that the Department does not base its estimate of the quantity and value of the production of our Silver Mines on the *gross* output, as, apart from the difficulty mentioned, allowance has to be made for the cost of treatment, &c., of the major portion of the products outside the confines of the State, also for the loss in extraction, &c. The practice adopted, therefore, is to take the *net* value of the ore, concentrates, bullion, &c., as declared by the several companies to the Customs Department at the date of export from this State, and the following statements are prepared on this basis.

Statement showing the Quantity and Value of Silver, Silver-sulphide, Silver-lead, and Ore, the product of this State, exported to the end of 1901 :—

Year.	Silver.		Silver-sulphide, Silver-lead, and Ore.				Total Value.
	Quantity.	Value.	Quantity.		Value.		
			Ore.	Silver-sulphide and Silver-lead.			
To end of	oz.	£ s. d.	tons cwt. qr.	tons cwt.	£ s. d.	£	
1881	726,779·14	178,405 0 0	191 13 0	.....	5,025 0 0	183,420
1882	38,618·00	9,024 0 0	11 19 0	.....	360 0 0	9,384
1883	77,065·90	16,488 0 0	105 17 0	.....	1,625 0 0	18,113
1884	93,660·25	19,780 0 0	4,663 1 0	.....	123,174 0 0	142,954
1885	794,173·80	159,187 0 0	2,095 16 0	190 8	107,626 0 0	266,813	
1886	1,015,433·10	197,544 0 0	4,802 2 0	.....	294,485 0 0	492,029
1887	177,307·75	32,458 0 0	12,523 3 2	.....	541,952 0 0	574,410
1888	375,063·70	66,668 0 0	11,733 7 0	18,102 5	1,075,737 0 0	1,142,405	
1889	416,895·35	72,001 0 0	46,965 9 0	34,579 17	1,899,197 0 0	1,971,198	
1890	496,552·80	95,410 0 0	89,719 15 0	41,319 18	2,667,114 0 0	2,762,554	
1891	729,590·05	134,850 0 0	92,383 11 0	55,396 3	3,484,730 0 0	3,619,539	
1892	350,661·50	56,884 0 0	87,504 15 0	45,850 4	2,420,952 0 0	2,477,836	
1893	531,972·00	78,131 0 0	155,859 1 0	58,401 3	2,953,589 0 0	3,031,720	
1894	816,822·00	94,150 0 0	137,813 8 0	42,513 2	2,195,339 0 0	2,289,489	
1895	550,142·00	81,858 0 0	190,192 19 0	29,687 7	1,560,813 0 0	1,642,671	
1896	202,789·00	26,518 0 0	267,363 1 0	19,573 4	1,758,933 0 0	1,785,451	
1897	150,065·00	16,711 0 0	270,913 11 0	18,105 7	1,681,528 0 0	1,698,239	
1898	533,059·00	59,278 0 0	388,460 4 0	10,108 13	1,644,777 0 0	1,704,055	
1899	692,036·00	76,913 0 0	424,337 5 0	20,289 10	1,993,744 0 0	2,070,657	
1900	774,203·00	90,243 0 0	420,909 11 0	17,928 6	2,513,874 0 0	2,604,117	
1901	448,501·00	50,484 0 0	400,156 18 0	16,921 5	1,803,979 0 0	1,854,463	
Totals	10,021,339·34	1,612,985 0 0	3,603,723 9 2	428,965 12	30,728,592 0 0	32,341,577	

NOTE.—The bulk of the silver produced in New South Wales is exported in the form of silver-lead and ore.

Statement showing the Quantity and Value of Lead (pig, in matte, also lead-carbonate and lead-chloride*), the product of this State, exported up to the end of 1901 :—

Year.	Quantity.	Value.	car.	Quantity.	Value.
	tons.	£		tons.	£
1887	522.30	6,711	1897	31.85	398
1890	126.00	1,587	1898	1,718.00	19,282
1891	199.65	2,025	1899	4,819.10	99,789
1892	70.90	726	1900	6,700.10	139,146
1893	425.80	4,205	1901	3,340.50	100,501
1894	31.15	260			
1895	19.80	197			
1896	23.85	259	Totals.....	18,020.00	375,086

* Lead-carbonate and lead-chloride are products of the leaching plants at Broken Hill. The quantity and value included in the above table are as follows :—

Year.	Lead Carbonate.		Lead Chloride.	
	Quantity.	Value.	Quantity.	Value.
	tons.	£	tons.	£
1899	1,331.10	43,774	220.00	11,843
1900	1,811.00	60,883	78.00	4,499
1901	1,915.00	82,690	.....	.....
Totals.....	5,057.10	187,352	298.00	16,342

Statement showing the Quantity and Value of Zinc Concentrates, the product of this State, exported to the end of 1901 :—

Year.	Quantity.	Value.	Year.	Quantity.	Value.
	Tons.	£		Tons.	£
1889	96.85	988	1897	23,841.80	23,688
1890	210.45	2,378	1898	38,941.30	28,941
1891	218.60	2,622	1899	49,878.90	49,207
1892	444.55	5,055	1900	20,269.05	44,187
1893	.....	.....	1901	631.99	4,057
1894	.....	.....	
1895	.....	.....	
1896	.....	.....	Totals	139,533.49	£161,123

The information in the following notes relating to the silver-mining industry is gathered from reports received from the Wardens and Mining Registrars :—

ALBERT MINING DISTRICT.

Broken Hill Division.

The year 1901 opened none too brightly for this Division, with the water in the Stephen's Creek reservoir nearly exhausted,—certainly unfit for human consumption, or even steaming purposes,—and when the welcome rains fell in February, there was, probably, not a month's supply available. So soon as the water difficulty was overcome, the price of lead commenced to fall, mine after mine being compelled to shut down, until at last but three were working full-handed. Consequently hundreds of men left for other fields, but, as these were generally the best and most enterprising, the supply of good miners at no time exceeded the demand. In a large centre like Broken Hill there will always be a certain number of unemployed, and this trouble was accentuated by the stoppage of all local works, &c., by the Municipal Council, in consequence of the adverse result of Equity suits with the Mining Companies. In this connection it may be stated that although on several occasions the Proprietary Company endeavoured to procure men at Broken Hill for the Port Pirie works, offering full wages, it was unable to do so.

As much has been said and written as to the wages earned by the miners, under the contract system in vogue in this Division, the Warden obtained from the principal mining companies the average wage paid to such contractors during the past year, which was as follows :—

	s.	d.
Proprietary Company	10	4 per shift.
Central „	10	3 „
South „	11	1 „
Block 10 „	10	0 „
Block 14 „	10	0 „

From the above it will be ascertained that the average earned is 10s. 4d. per shift; but when the large number of inexperienced and indifferent miners amongst those employed is taken into account, it will be found fair miners can earn from 10s. 6d. to 11s. 6d., and good men up to 15s. per shift of eight hours; probably the highest wages paid in any of the States.

The fall in the price of minerals has not been an unmixed evil, as efforts have successfully been made to effect the more economical working of the mines and treatment of the ores.

The most satisfactory event of the year has been the settlement of the long-voxed question of the renewal of the mining leases. This has given general satisfaction.

The low price of lead has partially paralysed the industry. The Proprietary Company has, however, increased the number of its employes and maintained its output (11,000 tons weekly). Delprat's shaft has been completed to the 650 foot level, and electric power installed at this level to supersede horse power for trucking, &c. Experiments

Experiments in the desulphurisation of slimes by roasting, made on a large scale, have, so far, proved entirely satisfactory. The following is the result of a kiln, recently roasted, containing 1,800 tons of slimes :—

Slimes raw—		After roasting—	
22.1 per cent.	Pb.	20.09 per cent.	Pb.
15.3	„ Zn.	11.72	„ Zn.
29.5 oz.	Ag.	21.10 oz.	Ag.
12.2 per cent.	Sulphur.	6.7 per cent.	Sulphur.

The process is, of course, an old one ; but it is doubtful if it could be profitably applied to slimes at the present price of metals, except in an extremely dry climate such as the Barrier. The Company has applied for land out of the town, with the intention of commencing operations on an extensive scale. The slimes have been accumulating as waste, at the rate of 30,000 tons per annum, for some years past.

The magnetic separation plant at the Central mine was completed in June last. It has since then been constantly running, although still in the experimental stage. So far results have been fairly satisfactory, and it is proposed to further increase the productive power. This Company contemplates putting in a cross-cut at the 1,000-foot level, in the shaft known as the "New Extended," to cut the lode in the "Central." This it is expected to do in 400 feet. The drive will then serve to drain the upper workings of the Central.

Block 10 Company, for a long time past, has not only been greatly cramped for room, but as its concentration plant is erected directly over the lode and workings, there is a constant danger of a subsidence of the ground upon which it is built. The Company has now applied for the lease of a rocky hill adjoining their property, and, if successful, will erect ore-dressing works to the value of some £35,000. A much-needed new main shaft is now being sunk away from the lode. Both sections of the mine have been opened up to the 1,000-foot level, where a lode of some size and good average grade has been found. These are the deepest workings on the Barrier.

The developments in the South mine are, probably, the best on the field, especially at the 850-foot level, where there are a series of pipes of good ore, each a small mine in itself.

Prospecting work has been vigorously proceeded with on the South Blocks, with extremely gratifying results. With a substantial rise in the price of lead, this mine will employ a large number of hands.

The British Company has as yet been unable to locate, at the 500-foot level, the main western lode worked at 400 feet, notwithstanding numerous drives and drill-bores have been put in. In Howell's section a large pipe of ore, known as the "Central body," has been encountered at 500 feet. This proved, when cut, to be 58 feet wide, and has been opened east and west 200 feet by drives : good strong ore occupying both ends.

The North Company has practically completed its new concentrating plant, at a cost of £36,000.

At the Junction North mine very little new work has been done.

The Junction Company has commenced development work on a limited scale. It is intended to sink Brown's shaft another 100 feet.

The Victoria Broken Hill Company is driving at the 240 and 400 foot levels, with good indications and a little ore.

The North Centrals has diligently prospected throughout the year at the 300, 500, and 700-foot levels, with excellent prospects but unsatisfactory results.

The New White Leads mine has been thoroughly equipped with machinery and unwatered, and some 300 tons of ore, obtained during exploration work, has been raised, but the mine is unworkable at the present price of lead.

The Pinnacles mine, probably, never had better prospects than at the beginning of the year. Good work was done by the present manager until the price of lead became unremunerative.

The Consols Company, with first-rate indications from time to time, has not discovered any large deposit of silver. A small quantity was unearthed recently, but, although the prospects were most encouraging, nothing further was found. The principal work done was at the lowest levels, where the lode is almost flat.

PEEL AND URALLA MINING DISTRICT.

Tingha Division.

At Howell, more commonly called in mining circles "Bora Creek," the Conrad Silver-lead Mining Company is situated, also the King Conrad Company and other properties of minor proportions.

The Conrad property consists of 60 acres held under mineral leases. It is a registered No-liability Company of 25,000 shares of £1 each—2,000 fully paid up, and 23,000 contributing paid up to 5s. The plant, which is valued at about £18,000, consists of 2 boilers (35 H.P. each), 1 boiler (15 H.P.), 3 horizontal engines (60, 75, and 140 H.P.), complete concentrating plant of the May Bros.' process, 2 Wilfley concentrating tables, 1 Frue vanner, 1 60 H.P. saw-mill plant, 1 winding engine 20 H.P., and other plant. On the whole, the mine is thoroughly well equipped, and is being well developed. The Managing Director, who resides most of his time at the mine, is Mr. John Howell, than whom perhaps there is no better known man in mining circles in the State. The mine is said to be paying fairly well, and the general impression is that the Conrad is a really good property. About 13,600 tons of ore were raised during the year, which produced 3,250 tons of lead, copper, and tin concentrates, which were disposed of for £26,572. No payment is received for the large quantity of tin contained in the concentrates in the form of sulphide. A considerable quantity of copper concentrates has been stacked at the mine pending the solution of the difficulty of effective treatment.

What is known as "The South Blocks" joins the Conrad Company on the south. The property consists of 100 acres, held as mineral leases. Nothing, however, but prospecting work has been done.

The next mine at Howell is "The King Conrad." This property consists of 60 acres of mineral leases. It is held principally by a Victorian company, the capital consisting of 200,000 shares at £1. The mine is well equipped, having plant and machinery on the ground to the value of about £9,000. The main shaft has been sunk to a depth of 412 feet, and some good work has been done, but as yet no return has been forthcoming. The concentrating plant has now, however, been completed, and a continuous output will be sent to the smelters. Altogether, about £32,000 has been expended on the mine in development and the erection of machinery, and during the present year there is every probability of good results being obtained.

There are several other mines and prospecting areas being worked in the neighbourhood of Howell, but nothing of any consequence has yet been developed. The district is a good one, and great things are expected of it. During the year the town has more than doubled in size, and some good buildings have been erected. The estimated total value of the yield for the year is £27,720.

Hillgrove Division.

Work at the Ruby Silver mine, held by the New Zealand Mines Trust (Limited), was largely confined to prospecting during the year. The shaft was continued to a depth of 409 feet, the last 150 feet of which is in absolutely barren ground. The question of sinking the shaft to a greater depth is under consideration, but no decision had been arrived at to date. The Company has let the mine to tributors for a term, and it is hoped their efforts will meet with better success than has recently attended those of the Company.

Hardwicke and party have a large amount of ore at grass waiting treatment, and the mine, when further developed, should give a satisfactory return, as the trial parcels which have been treated were quite up to expectations.

Armistale Division.

From the lease held by Baker and Party on private lands at Tait's Gully, 90 tons of ruby silver ore were raised during the year, which were estimated to contain 14,400 oz. of silver and 40 oz. of gold, representing a total value of £1,400. This was the result of four months' work.

Glen Inn's Division.

A fair amount of prospecting for silver was carried out by a syndicate at Wellingrove in this Division, but the results obtained were very unsatisfactory, and operations have accordingly been abandoned.

SOUTHERN MINING DISTRICT.

Burrowa Division.

The main shaft on the leases held by Messrs. Stevenson and Party at Rye Park has been sunk to a depth of 203 feet. At the 140-foot level a drive was put in for some 67 feet, and along the whole distance traces of galena were disclosed. At the 203-foot level a drive was put in for 27 feet, but work had to be abandoned on account of the heavy water. Suitable pumping machinery is now, however, being obtained, when operations will be resumed.

The Walla Walla Tribute Company has five shafts down, the deepest being 175 feet. Some 800 feet of driving has been done, and in every level, it is stated, there is a large lode carrying silver and lead. The mine is equipped with a steam winding and pumping plant, Hartz jig and Willey concentrating table, and ten head of stamps. The attempt to produce galena concentrates has not been quite successful, owing to the presence of a large quantity of iron in the ore. The carbonate ore has, however, proved up to expectations, and the erection of smelters on the mine is in contemplation.

Picton Division.

Silver-mining has continued to be actively prosecuted during the past year at Yerranderie (Upper Burragorang), and two more mines, viz., Kerry and Mayes, and Maddock and Taylor have entered on the producing stage.

The output and value of the associated minerals was in excess of that won during 1900, and would have been very much greater had not the largest mine (Colon Peaks Co.) been closed for the last three months.

The mountain road to Camden has been much improved, important deviations having been completed during the year, which will have a very beneficial effect on the industry in allowing of larger loads being carted by the teams, and with the bridge over the Wollondilly River, now nearing completion, the means of access from the mines to the railway will be very materially improved.

The estimated output from the mines is as follows:—952 tons silver-lead ore raised and sold, containing 174 oz. gold, 86,017 oz. silver, 125 tons of lead, to the value of £11,000.

A detailed report by Mr. Geological-Surveyor Jaquet on this field will be found in the Appendix to this volume.

NEW ENGLAND MINING DISTRICT.

Drake Division.

In this Division the silver is associated with the gold and copper ores, and details respecting the output, &c., will be found in the report on this Division under the "gold" notes. The returns show that 20,321 oz. of silver, valued at £2,157, were won during the year.

Emmaville Division.

There is little to record in this Division, the Webb's Consols mine was granted suspension of the labour conditions, and work has not since been resumed.

The Mount Galena mine has also been closed down.

The shutting down of these two mines threw between seventy and eighty men out of employment.

Wilson's Downfall Division.

There have been no new finds of note during the year, and the silver ore won has been principally obtained from abandoned shafts and drives. The lodes vary in size from 18 inches to 5 feet, and contain rich shoots from which the ore has been picked and sent to Aldershot and Cockle Creek for treatment. The low grade ore which will not pay for despatch is left on the surface and is valueless; the want of treatment works on the field is greatly felt by the miners. The picked ore sent from here gives a return of from 110 to 200 oz. per ton. It is about twelve years ago since the silver lodes were first discovered at Rivertree, and it soon became a prosperous locality. The ore at one time was treated in the centre of the mines at Rivertree, but the works not proving a success the field has dwindled down to its present state.

The introduction of capital, and operations on an extensive scale, would, no doubt, soon demonstrate the importance of these lodes.

COBAR MINING DISTRICT.

Bobadah Division.

Very little ore has been raised by the Overflow Company during the year. A water-jacket furnace was erected for the purpose of treating the complex ore, as were also refining furnaces, but work in a regular way has not yet been started owing to the absence of sufficient flux, &c.

MUDGEE MINING DISTRICT.

Mudgee Division.

Assistance from the Prospecting Vote has been granted to a party of miners at Mount Scott, Leadville, and the shaft has been sunk to a depth of 125 feet, but payable ore had not been disclosed to date.

LACHLAN MINING DISTRICT.

Wyalong Division.

In the course of prospecting a newly discovered tin lode at Buddigower, 12 miles south-west from West Wyalong, it was found that a large silver lode crossed the tin lode at right angles, running east and west, while the tin lode is north and south. The tin occurs in granite and the silver in granite and slate. The silver lode has assayed from 100 to 400 oz. of silver to the ton.

HUNTER AND MACLEAY MINING DISTRICT.

Kempsey Division.

A promising lode was discovered at Macksville, on the Nambucca, and prospecting aid was granted to further test it. Considerable work was done by several parties on the field, but water was met with, and it is understood that the lode did not improve with depth. Half a ton of ore was sent to Sydney for trial, but the returns were not encouraging.

BATHURST MINING DISTRICT.

Mitchell (Sunny Corner) Division.

The Sunny Corner mine is the only silver mine in operation in this Division. During the year, 300 tons of sulphide ore were mined, but work was principally confined to smelting a portion of the large stock of ore which was in the kilns.

This Company has acquired possession of the Nevada Copper mine with the object of mixing the ore obtained with that of the Sunny Corner mine, and has connected the mine by a tram line with the smelting works. The mine has been unwatered and retimbered, and the prospects are considered to be favourable. Some 300 tons of ore were raised and smelted with the other ores during the year.

The estimated total yield from 3,814 tons of ore is 15,256 oz. of silver, 190 oz. of gold, and 33 tons of copper, valued at £4,314.

Tuena Division.

No actual mining has been done on the leases at Mount Costigan and Cordillera, and operations have been confined to fossicking on the dump heap. The slag, which was thrown away by the previous lessees, has been broken up and sorted. A considerable quantity of this material was got together in this way, and despatched to Dapto for treatment.

Oberon Division.

The pyritic lode at Black Bullock Mountain, which was worked by Mr. Thos. Buckland during 1900, has been further developed during the year: 829 tons of ore sent to Dapto for treatment yielded 566 oz. of gold and 11,780 oz. of silver, representing a total value of £3,680.

Messrs. P. Ewing and Party, from an adjoining property, raised 351 tons of ore which yielded 76 oz. of gold, and 25 oz. of silver, the total value of the ore being £297.

COPPER.

COPPER.

The value of the copper produced in this State during the year 1901 from local ores, was £413,302, as compared with £128,063 for the previous year, thus showing a decrease of £14,734. Copper to the value of £32,864 was obtained in addition from ores imported for treatment in this State.

The gratification arising from a sustained and a remunerative copper market during 1900 was suddenly dispelled towards the close of 1901 by the serious and unexpected fall in the value of the metal. The gravity of the situation in the State was accentuated by the fact that many of the copper mines are located in the Western District, which was passing through a period of excessive drought, and which consequently greatly enhanced the cost and difficulties of production. It, therefore, became a pressing question as to whether work could be profitably carried on with the low market value ruling, but owing chiefly to the exercise of many economies, although the output was restricted, none of the large mines were closed down during the year.

The most important discovery recorded during the year was that of a very promising lode near Crowl Creek, about 30 miles, south-westerly from Nymagee, now known as Shuttleton. High-grade ore to the value of several thousand pounds has been despatched to Cobar, and the sale of the mine at a high figure has recently been reported.

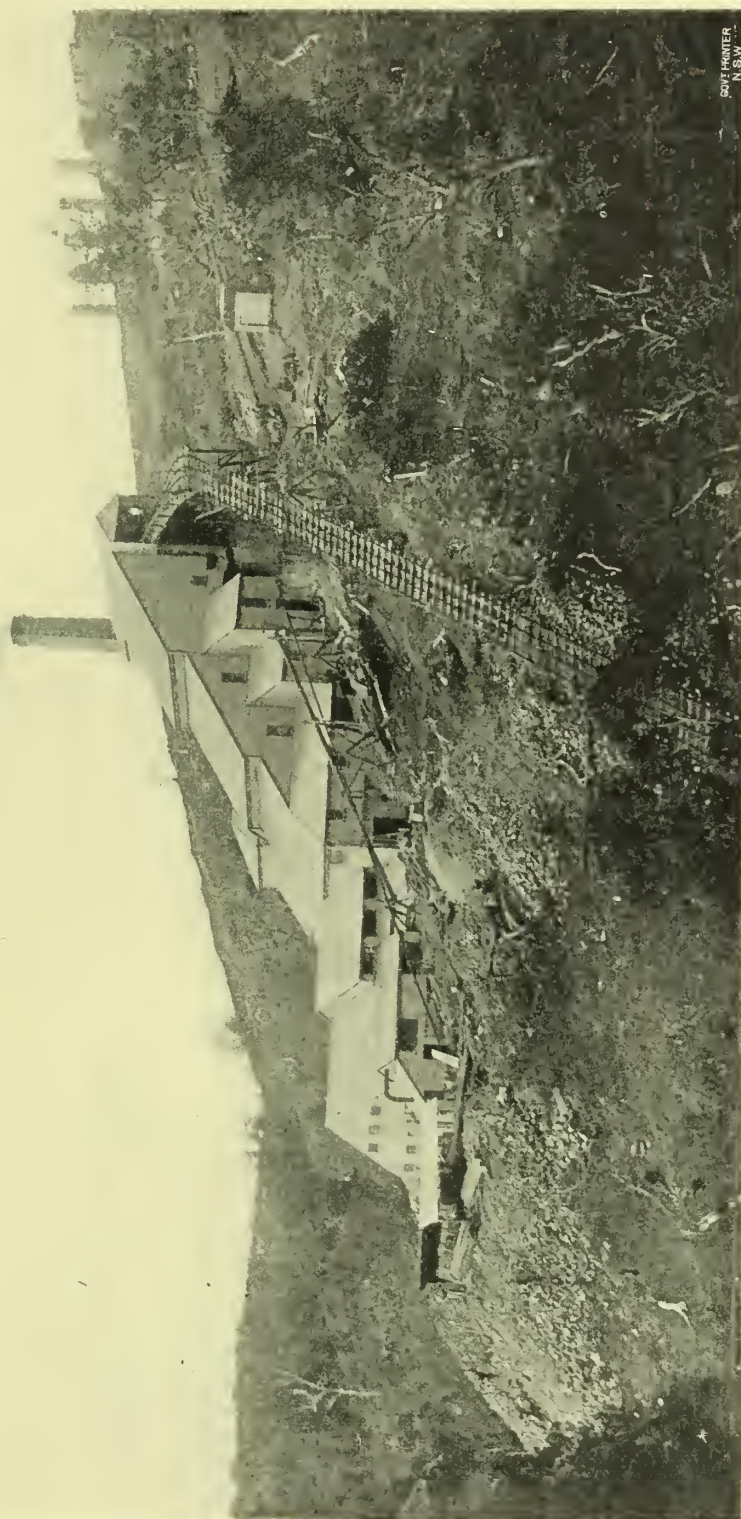
It is satisfactory to note that ore from the Cobar-Chesney Mine is being smelted in the blast furnaces of the Great Cobar Mining Company, and that copper ores from other mines in this district are also being sent to these reduction works. It is hoped that this constitutes an index of the trend of future developments, for, as pointed out in last year's report, in the closer union and community of interests, lie the greatest possibilities of the successful and economical working of our copper lodes.

Good work is being done in the direction of systematically developing the lodes at Mount Hope, and should the projected railway from Condobolin to that place be constructed, it should greatly influence the prosperity of that district.

The following Table shows the quantity and value of copper exported from this State, from 1858 to 1901* :—

Year.	Ingots.		Ore and Regulus.		Total Value.
	Quantity.	Value.	Quantity.	Value.	
	tons cwt.	£	tons cwt.	£	£
1858	.....	.....	58 0	1,400	1,400
1859	30 0	578	.....	.....	578
1860	.....	.....	43 0	1,535	1,535
1861	.....	.....	144 0	3,390	3,390
1862	.....	.....	213 0	5,742	5,742
1863	23 0	1,680	114 0	420	2,100
1864	54 0	5,230	.....	.....	5,230
1865	247 0	15,820	22 0	545	16,365
1866	255 0	18,905	23 0	1,885	20,790
1867	393 0	30,189	0 2	5	30,194
1868	644 0	23,297	172 10	4,000	27,297
1869	1,980 0	74,605	104 0	2,070	76,675
1870	994 0	65,671	6 0	60	65,731
1871	1,350 0	87,579	94 0	1,297	88,876
1872	1,035 0	92,736	417 0	13,152	105,888
1873	2,795 0	237,412	51 0	1,690	239,102
1874	3,638 0	311,519	522 0	13,621	325,140
1875	3,520 0	297,334	157 0	4,356	301,690
1876	3,106 0	243,142	169 0	6,836	249,978
1877	4,153 0	307,181	360 0	17,045	324,226
1878	4,983 0	337,409	236 0	7,749	345,158
1879	4,106 15	256,437	36 7	915	257,352
1880	5,262 10	359,260	131 18½	4,799	364,059
1881	5,361 0	350,087	132 16	4,975	355,062
1882	4,865 3	321,887	93 1	2,840	324,727
1883	8,572 17	574,497	84 10	2,704	577,201
1884	7,286 6	415,601	18 18	578	416,179
1885	5,745 5	264,905	0 15	15	264,920
1886	3,968 18	166,429	57 18	1,236	167,665
1887	4,463 19	195,752	299 8	3,350	199,102
1888	3,786 1	272,110	113 6	2,924	275,034
1889	3,983 16	203,319	198 4	3,322	206,641
1890	3,165 9	163,537	580 9	9,774	173,311
1891	3,860 3	191,878	665 8	13,215	205,093
1892	3,535 0	160,473	1,299 4	27,233	187,706
1893	1,051 0	44,235	1,016 0	14,191	58,426
1894	1,556 11	61,034	580 6	12,447	73,481
1895	2,793 3	119,300	1,058 0	21,585	140,885
1896	4,453 0	200,236	14 17	75	200,311
1897	6,756 3	299,829	166 5	851	300,680
1898	5,653 19	280,048	178 9	839	280,887
1899	4,640 15	330,120	1,337 3	69,694	399,814
1900	5,622 6	395,103	1,470 3	32,933	428,036
1901	5,688 0	383,698	1,114 10	30,264	413,962
Totals	135,677 19	8,159,462	13,553 7½	347,497	8,506,959

* Includes copper refined in New South Wales, from imported ores, to the end of 1898



SOUTH AUSTRALIA
BURRAGE

SITE OF CONCENTRATING PLANT, LLOYD COPPER MINE BURRAGA.

The following notes are taken from the reports furnished by the Wardens and Mining Registrars:—

COBAR MINING DISTRICT.

Cobar Division.

The Great Cobar Copper Mining Syndicate has carried on operations vigorously throughout the year. The ore, chiefly chalcopyrites, has been won from some twenty stopes, and the greatest depth at which it has been obtained is from the 892-foot level at the bottom of the "new" shaft. The ore body at this depth has every appearance of being equal both in quality and quantity to that in the upper levels. The want of water nearly caused the smelters to shut down on two occasions during the year, and when it is considered that some 600 men are employed, the serious effect the closing down of the mine would have on the town of Cobar is apparent.

The Cobar-Chesney Copper and Gold Mining Company has confined operations to proving the extent and value of the deposits of copper ore. About 4,500 tons of ore were sent to the Great Cobar Company's smelters for the purpose of ascertaining its value. The net returns were equal to 3 per cent. copper and about 1 dwt. of gold per ton. There is now a vast extent of ore in sight, which the Manager anticipates will return 3 per cent. of copper. The average width of the ore body is given as 35 feet over a length of nearly 800 feet.

The new Phoenix Company has been doing a little prospecting and was successful in discovering some veins of good copper ore at the 288-foot level.

The Mount Pleasant Company has been working some rich pockets of carbonates and grey and yellow sulphides of copper, and despatching the ore to the Great Cobar works for treatment.

Some 6 miles south-west of Mount Boppy a find of grey copper ore is being prospected by C. Knight.

In this neighbourhood Messrs. Saunders and Longworth have obtained a number of bunches of similar rich grey ore in larger quantity than on Knight's claim.

The estimated production of this Division for the year is 42,299 oz. of gold valued at £145,146; 51,142 oz. of silver valued at £5,114; and 7,306 tons of copper and ore valued at £192,989—or, a total value of £343,249.

Nymagee Division.

Despite the difficulties of transport of coke and materials, the Nymagee Copper Mining Syndicate has been mining and smelting steadily during the year. Stopping has been in progress at the 414, 516, and 618-foot levels, whilst a fresh body of ore has been discovered at the lowest level, 734 feet. The quality of the ore is still high, much of the material smelted being worth over 8 per cent. of copper.

To the south, the old shaft known as Hardie's has been reopened, and large quantities of good oxidised and carbonate ores have been proved.

During the year a new water-jacket furnace was blown in, and a system of hot-blast partial pyritic smelting inaugurated.

The North Nymagee Company has not yet been successful in locating a payable ore body, despite the energetic exploratory work carried on during the year.

At Shuttleton, the new township on the Wirlong field, work has been more active in consequence of the rich copper ore found there.

In the Commonwealth Mine a vein over 2 ft. thick of rich grey ore has been proved for a length of 150 ft. by 100 ft. in depth. The width of this ore varies from 1½ ft. to 4 ft., while outside this vein some 10 ft. to 15 ft. or more of highly payable though less rich ore has been found. Work has so far been confined to getting out the high-grade ore, bagging it, and sending same by team to Cobar. Five or six other parties of men are looking for the extension of the lode in adjoining claims north and south, but so far only small bunches of rich ore have been found. The site for a town has been laid out, and already there is the nucleus of a small village on the ground, but its future would seem to depend on the payable ore being proved to exist at a depth in the Commonwealth Mine.

The estimated value of the copper and ore won in this Division during the year is £42,191.

Nyngan Division.

Work at the Girilambone Copper Company's mine has been confined chiefly to the concentration and dressing of ore for shipment to the smelting companies, and no fresh developments are reported as having occurred during the year. The ore has been won principally from the stopes at the 120-foot and 420-foot levels, and in addition a small quantity has been obtained from the open cut. The ore body at a depth gives some promise, but the mine needs to be extensively opened out, and under existing market conditions this cannot at present be undertaken.

Mount Hope Division.

There are two companies at work in this Division, the New Mount Hope Copper Mining Company, Limited, situated close to the township, and the Great Central Freehold Mine, situate some three miles distant.

The New Mount Hope Copper Mining Company, Limited, is the only mine that has been treating copper ore during the year. For several years this property was in the hands of tributers, but during the past year the company again assumed control, and has since worked the mine systematically. The shaft has been widened, and a winding cage fitted therein, a rock-drill plant has been installed, and tram-roads laid at various levels down to the 270-foot level. A new crushing mill is in course of erection.

The Great Central Freehold Mine, Limited, has been engaged during the year in erecting machinery, with a view to the proper development of the property. A great deal of exploring and developing work has been carried out, and a large quantity of ore is now at grass. An immense tank to conserve water has been excavated on the property, but, unfortunately, since its completion very little rain has fallen. It has a good catchment, and when once filled the mine should never run short of water. This company has afforded employment to a very large number of men, and hence it has been a flourishing year for the township of Mount Hope.

About 11 miles from Mount Hope is situate the Mount Allen Mine. This property has been purchased by the Great Central Freehold Mines Limited. It was originally worked as a gold-mine, but has been shut down during the year.

On Mount Dromedary, which adjoins Mount Allen, several mineral leases are held. They have only been spasmodically prospected during the past twelve months, suspension of the labour conditions having been secured by the lessees. The ore in this mountain contains a percentage of gold and silver, and with proper facilities at hand for treating same, should pay to work. At the present time negotiations are pending for the purchase of the whole of these leases by a syndicate. If such can be accomplished, it will be an immense advantage not only to Mount Allen but to the whole District. The owners of these leases are not, at the present time, in a position to employ labour for the proper development of the properties, and hence, the progress of the district is retarded.

The estimated total value of the copper produced in this Division during the year was £11,640.

BATHURST MINING DISTRICT.

Burranga Division.

The Lloyd Copper Mine has been in full swing for the whole of the year, and the results have been very satisfactory. The quantity of ore raised was 21,508 tons, which realised 1,059 tons of copper, valued at £64,599.

The five old reverberatory furnaces are all that have been in operation, and should the new machinery, which at the close of the year had just been got into working order, prove successful, the output for 1902 should be considerably augmented.

The new concentration plant cost £22,000, and the reverberatories and calciners, £10,000.

The lode, which averages 5 feet in width, gives no evidences of diminution in value, and there is some years supply of ore in sight. The dam constructed by this company at Thompson's Creek is estimated to impound 80,000,000 gallons of water, there being sufficient stored at the close of the year to keep the works going for twelve months. The cost of the dam and line of pipes was £17,000.

There are about 60,000 tons of firewood stacked in the yard. This company employs about 500 men, and the mine and all the works are lighted with electricity.

The

The Burrage Copper Company has not been successful in striking payable ore in its mine situated about 1 mile east of Lloyd Copper Mine; the shaft is down about 200 feet, and a drive is in some 60 feet through a large ledge carrying a little copper ore.

No work has been done on the South Burrage property during the year, but tenders have been accepted to sink the present shaft another 50 feet.

Messrs. Boon and McDonald have taken up a 40-acre lease on what is known as Sprague's Mine, $1\frac{1}{2}$ miles north-east of Burrage, and are busy sinking a main shaft to thoroughly test the lode, and purpose sending a 10-ton consignment to Dapto for treatment.

At the Bonny Dundee Mine, half a mile east of Burrage Township, the old 130-foot shaft has been sunk a further 40 feet; there is, in this mine, a very big quartz lode carrying a few pennyweights of gold to the ton, but as depth is attained it appears to be turning into a copper lode. Messrs. Cooper and Litchfield who are now working this mine, are in hopes of eventually intersecting a good copper lode.

Blayney Division.

The Blayney Mining and Smelting Company has a freehold of 50 acres close to the town of Blayney. During the past twelve months the company raised 18,666 tons of ore, from which 418 tons of copper valued at £27,170 were obtained. The main shaft has been sunk a further 90 feet, making the total depth 390 feet, while another shaft known as the "De Rose," was sunk to the 107-foot level.

A second water-jacket furnace has been recently erected. This mine was shut down towards the close of the year, and as it is the mainstay of the town, it proved a serious matter for the business people.

Cowra Division.

The King of England and John Bull Mines are situated upon Crown lands in the Illunie Mountains, 17 miles in a southerly direction from Cowra.

The lode has been visited and inspected by Mr. Geological-Surveyor Jaquet, and his report will be found in the appendix to this volume.

Rockley Division.

The Dingo Copper Mining Company, at Essington, disposed of some 250 tons of ore during the year. The ore is hand dressed at the mine, and is then sold to the Lloyd Copper Company, Burrage.

Messrs. Low and West, at Red Hill, near Cow Flat, have confined work principally to prospecting, and have not as yet succeeded in discovering any well-defined body of ore. The ore raised during the year amounted to about 250 tons, 53 tons of which were disposed of, the balance being at grass.

The Morgan's Mining Company at Belmore, near Cow Flat, worked for about four months of the year. The main working shaft was sunk vertically from the 60-foot to the 110-foot level. Good yellow sulphide ore is obtained in patches, and when dressed, averages about 11 per cent. of metal. A small brick blast furnace was erected, and 620 tons of low-grade ore (about 3 per cent.) were smelted, which produced a matte averaging 40 per cent. of copper.

The old Summer Hill Copper Mine, on the Bunnamagoo Estate, was taken up by Mr. F. Tapson in September last. This mine was one of the first worked in the State, and great difficulty was experienced in unwatering same, as all the timbers had fallen in. The lode, of good yellow ore, at the bottom of the shaft is about 6 feet wide, and assays about 10 per cent. Mr. Tapson is of opinion that this will be a highly payable mine when opened out.

Oberon Division.

The mines which are held by local residents at Tuglow, have been idle during portion of the year. There are very promising indications of the existence of permanent copper lodes in this locality, and it is to be regretted the offers which were made by capitalists some two years ago, for the purchase of the several properties, were not accepted.

Orange Division.

A company secured the right to mine on 100 acres of Mr. J. Glasson's private land at Guyong during the year. Several shafts, varying in depth from 70 feet to 150 feet, were sunk; no ore was, however, disposed of.

The Gold and Copper Fields Syndicate, at Carangara, near Byng, was at work until the middle of May, and ore to the value of £220 was obtained.

The Mount Fraser Copper Mines, Limited, at Springfield, near Byng, was in operation until October last, the value of the ore won being £203.

The Mount Bulga Copper Company has been engaged erecting machinery, sinking a main shaft, and opening out at the 200-foot level during the year, and no ore was treated.

The Britannia Syndicate at Lewis Ponds was at work for a period of 6 weeks with the object of testing Payne's improved method of extracting copper from ores, and it is claimed that highly satisfactory returns were obtained by this process.

O'Connell Division.

Rea and Foley, the owners of the Phoenix Copper Mine, at Wiseman's Creek have a main shaft down 135 feet, and two other shafts 100 and 60 feet respectively, and about 250 feet of driving has been done. A furnace has been erected on the mine, and there is also a reservoir capable of holding 500,000 gallons of water. No returns respecting the operations conducted during the year have been received from the proprietors.

Hunter, Wiley, and party at the South Wisemans Copper Mine have sunk one shaft 140 feet, and another 30 feet, and driven 580 feet, but no other particulars are available.

Sunny Corner Division.

The Nevada Mine was taken possession of during the year by the Sunny Corner Silver Mining Company, unwatered, retimbered, and connected to the smelting works of the company by a tram-line; some 300 tons of ore were raised, which were smelted with ores from the Sunny Corner Mine. The estimated amount of copper contained in the matte from the 3,814 tons of ore smelted is 38 tons.

ALBERT MINING DISTRICT.

Broken Hill Division.

There is little to report in this Division as nothing new worth noting has been discovered, while the fall in valued has shut up many of the smaller mines. The Government Smelting Works at Port Augusta, South Australia, have been closed, and the purchase of ores discontinued. This will be a matter of much regret to small holders, as these works gave every satisfaction.

A fair amount of work has been done at Balaclava, but it still remains a prospecting show only.

A lot of opening-out work has been done at the Nadbuck Copper Mine; this lode continues small but very good. Owing to the low price of copper the mine is now worked on tribute.

Mr. Geological-Surveyor Jaquet made an inspection of the copper lodes in this locality during the year, and his report will be found in the Appendix to this volume.

White Cliffs Division.

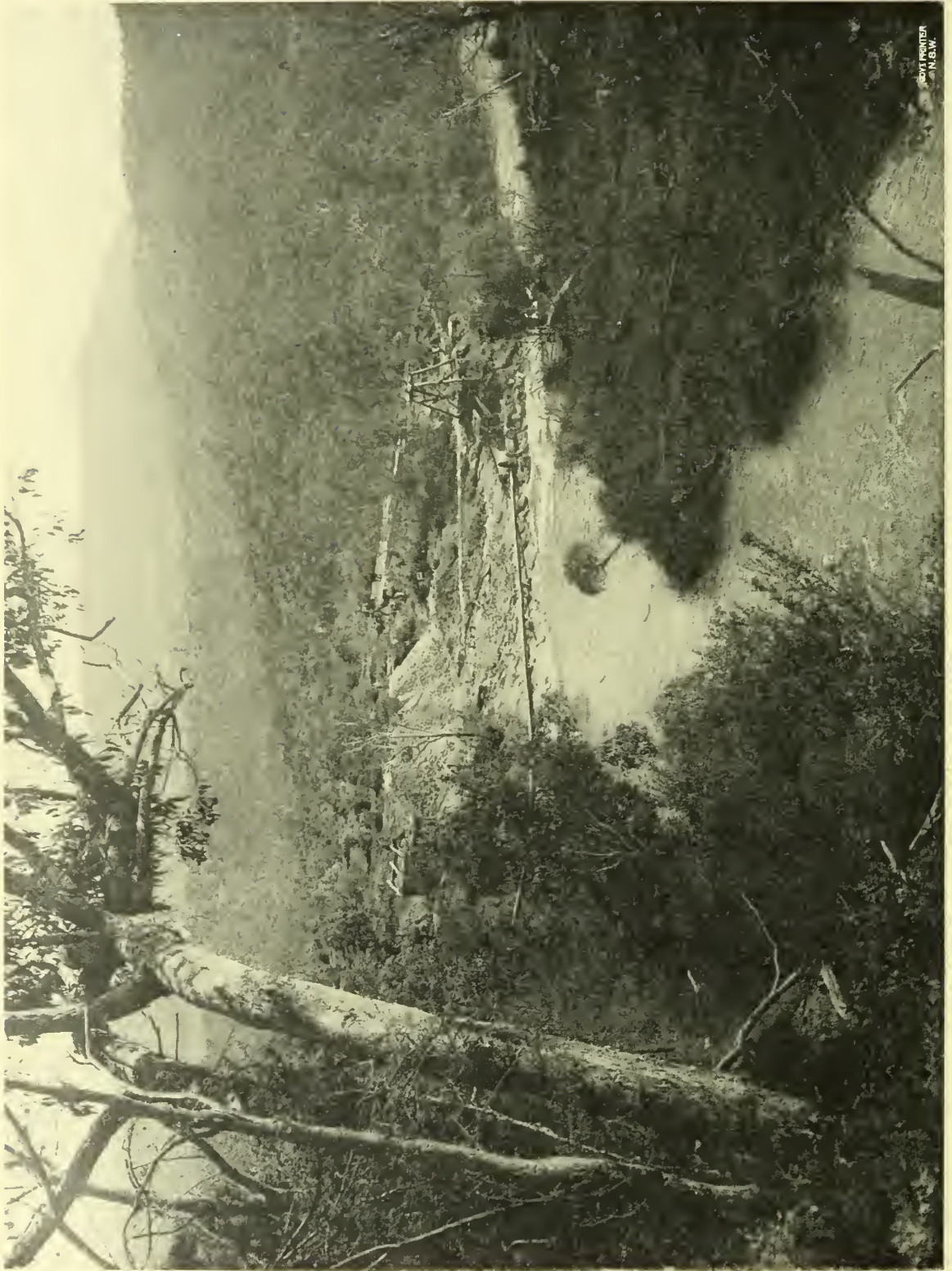
Although indications of copper lodes have been found in various places throughout this Division, the only place where any serious attempt to work them has been made is at Wertago.

This field was visited by Mr. Geological-Surveyor Jaquet and a detailed report furnished by him, which will be found in the Appendix to this volume.

The mines were worked during the first quarter of the year, the value of the production being set down at £452, while between 300 and 400 tons of good ore are at grass; since that time they have been shut down, and suspension of the labour conditions has been granted pending an attempt to place the mines upon the London market with the object of obtaining further capital. If it can be secured, it is proposed to construct a tramway from the present terminus of the tramline at Tarrawingie Flux quarries, 40 miles north of Broken Hill, to the leases. The line would be about 90 miles in length, and if continued on to White Cliffs it would prove of very material benefit to the whole district.

Milparinka Division.

Work at the Kooningberry Ranges has been confined to prospecting, and none of the ore raised has been treated.



JOE PRATER
N.S.W.

THE LOBB'S HOLE COPPER MINE, KIANDRA DIVISION.

PEEL AND URALLA MINING DISTRICT.

Tamworth Division.

Taking the finds made, with their results, it is quite possible that copper will yet become a considerable factor in the mining prospects of the Tamworth district. Bregenzer and party have forwarded for treatment during the past year 350 tons of ore from their mine at Trough Gully, which averaged $7\frac{1}{2}$ per cent. of copper, and realised 12s. per unit, the gross value being £1,575. Owing, however, to the fall in the price of copper the miners engaged have been discharged, and the mine is now worked solely by the party. After all the expenses of the treatment, &c., of the ore had been met, the balance gave a satisfactory dividend to the mine-owners.

The further find of Mr. Stindte has every appearance of being large, permanent, and rich. From the mine known as Fisher's—a mineral conditional purchase—no ore has been sent for treatment during the past year. That which had previously been despatched gave a favourable result, but until the metal has reached a higher value, the ore will only be stacked, and the mine worked with just sufficient labour to hold the ground.

Walcha Division.

In this Division copper ore to the extent of 22 tons, valued at £244, was raised during the year; this was the result of the labour of several parties of prospectors.

Barraba Division.

The Gulf Creek Company has been working steadily throughout the year, and has employed on an average about 110 men, but what with carters carrying supplies and ore from the mine, and timber-getters, this mine finds employment for fully 200 hands.

During the year 9,400 tons of ore were raised and smelted at the mine, resulting in 560 tons of copper valued at £36,280.

The mine gives every indication of permanency. In a short time a village will be proclaimed at Gulf Creek, and there are already a fair-sized public school, a police station, one hotel, and three or four stores here.

The company is making bricks on its lease, and has already erected one or two substantial brick buildings for managers' residence, &c.

At Spring Creek, Ironbark, Messrs. Trevenack, Salter, and Tyrrell, are opening up a 20 acre lease, but so far there has been nothing much done beyond prospecting; 40 tons of ore were raised and sold for £250.

Bingara Division.

The Mount Everest Mining Syndicate, at Top Bingara, employed during the year about twelve men, and did a good deal of prospecting work, the body of ore discovered is of low grade, and is despatched to Gulf Creek to be smelted.

At Bobby Whitlow, Messrs. Gordon and Thompson have done a good deal of work, more especially in the early part of the year. There are two shafts, one down 120 feet and the other 140 feet, and about 150 feet of driving has been done.

The estimated value of the copper ore disposed of from this Division during the year was £1,570.

Bundarra Division.

The Bundarra Copper Mine has closed down, and no ore was raised during the year.

A little desultory prospecting is being carried on, but the future prospects are anything but encouraging.

MUDGE E DISTRICT.

Dandaloo Division.

Fowler and Coy raised about 250 tons of ore during the year. About 45 tons were despatched to Dapto Smelting Works, averaging about 15 per cent. of copper, with traces of gold and silver. The remainder of the ore averages from 8 to 10 per cent. of copper, and will not pay to send away for treatment.

Keenan and party, at the Alberts, have sunk a main shaft to a depth of 160 feet, the lode being about 2 ft. 6 in. wide, carrying a little copper. Ore to the value of £875 was disposed of during the year.

Lind and party, also at the Alberts, sent about $23\frac{1}{2}$ tons of ore to Cockle Creek, which was valued at £260. They have about 50 tons of second quality of ore at grass, which is of too low a grade to permit of profitable treatment other than on the field.

Mudgee Division.

During the latter months of the year G. Greaves and party have been prospecting a copper lode at Bullinda, about eight miles from Leadville, promising prospects have been obtained, but the work of development is not yet sufficiently advanced to justify an opinion as to the value of the lode.

From three to four men were constantly employed at the Mount Stewart Mine, Leadville, during the year endeavouring to open up a copper lode, but no payable ore has as yet been discovered.

Wellington Division.

The only copper mine in this Division is at Belara, and but little work was done during the year. It is understood that the owner is endeavouring to obtain capital to thoroughly develop the mine.

LACHLAN MINING DISTRICT.

Forbes Division.

The mine held by McNicol and party at Eurow, nine miles from Eugowra, was only worked for a period of four months during the year. The ore obtained ranges from 16 to 20 per cent. of metal, the total value of the yield for the period during which the mine was worked being £615.

The Vyehan Mine, held by Clayton and party, also at Eurow, was in operation for five months of the year, when work was suspended with the object of securing capital for its further development. The ore averages from 15 to 19 per cent., and the yield for the five months was valued at £720.

Fifield Division.

Some prospecting operations have been proceeded with during the year at the Lightning Paddock, Burra, where there are a few promising-looking reefs, and the general indications are very encouraging.

TUMUT AND ADELONG MINING DISTRICT.

Kiandra Division.

There are two copper mines in operation at Lobb's Hole, in this Division, and a detailed report on the lodes, by Mr. Geological-Surveyor Andrews, will be found in the Appendix to this Report.

The value of the copper won during the year by Messrs. Reeckmann and Forsstrom is £3,166.

Delegate Division.

A discovery of copper is reported as having been made by Mr. Johnston close to the Victorian border, and prospecting operations have been actively carried on. Up to the close of the year, however, no ore had been treated.

HUNTER AND MACLEAY MINING DISTRICT.

Kempsey Division.

Aid was granted from the Prospecting Vote to a party working at Yarras, at the head of the Hastings, but there is nothing favourable to report at this date, although the indications were at first very good. Work is still being carried on, but the locality is very mountainous, and at a considerable distance from Kempsey.

The mines at Willi Willi, which were being worked by Messrs. Baker Brothers, have been abandoned, and all the plant removed.

CLARENCE AND RICHMOND MINING DISTRICT.

Grafton Division.

A number of mineral leases were applied for during the year in the vicinity of Yantalla Creek, but the only holding on which any work has been done is that of Harps and party. This party has two shafts on the lode, the deeper of which is down 40 feet. A parcel of 4 tons of ore from this shaft returned 22 per cent. of copper, 2 dwt. of gold, and 13 dwt. of silver per ton.

It is expected that active work will be proceeded with as soon as the leases which have been applied for are issued.

NEW ENGLAND MINING DISTRICT.

Drake Division.

The copper in this Division is principally found associated with gold and silver. Particulars of the various mines, and details respecting the output, will be found in the report on the Drake Division under the heading "Gold."

The estimated value of the copper won in this Division during 1901 is set down as £5,210.

TIN.

The estimated value of the tin won during 1901 is £77,315, as compared with £120,932 for the previous year, a decrease in value of £43,617.

In addition to the tin won in this State, ore to the value of £59,463 was imported to be refined here.

The tin ore raised in this State is obtained largely from alluvial deposits, many of which have been previously worked, and now provide employment only for fossickers. The long-continued drought has prevented washing being done on the majority of the fields, and as a result a considerable decrease is shown in the output of stream tin.

Another factor which contributed to the decrease was the cessation of active operations at the Ottery Mine, Tent Hill, after a period of some twenty years' continuous work.

Good progress has been made during the year in the Inverell-Tingha Divisions, and, in addition to important alluvial workings, a promising lode, known as the Leviathan, has been opened up; an extension, it is said, of this lode is being proved by the Dolcoath Syndicate some 5 miles distant. Much attention is being drawn to these holdings, as the developments are likely to have a most important effect on the industry.

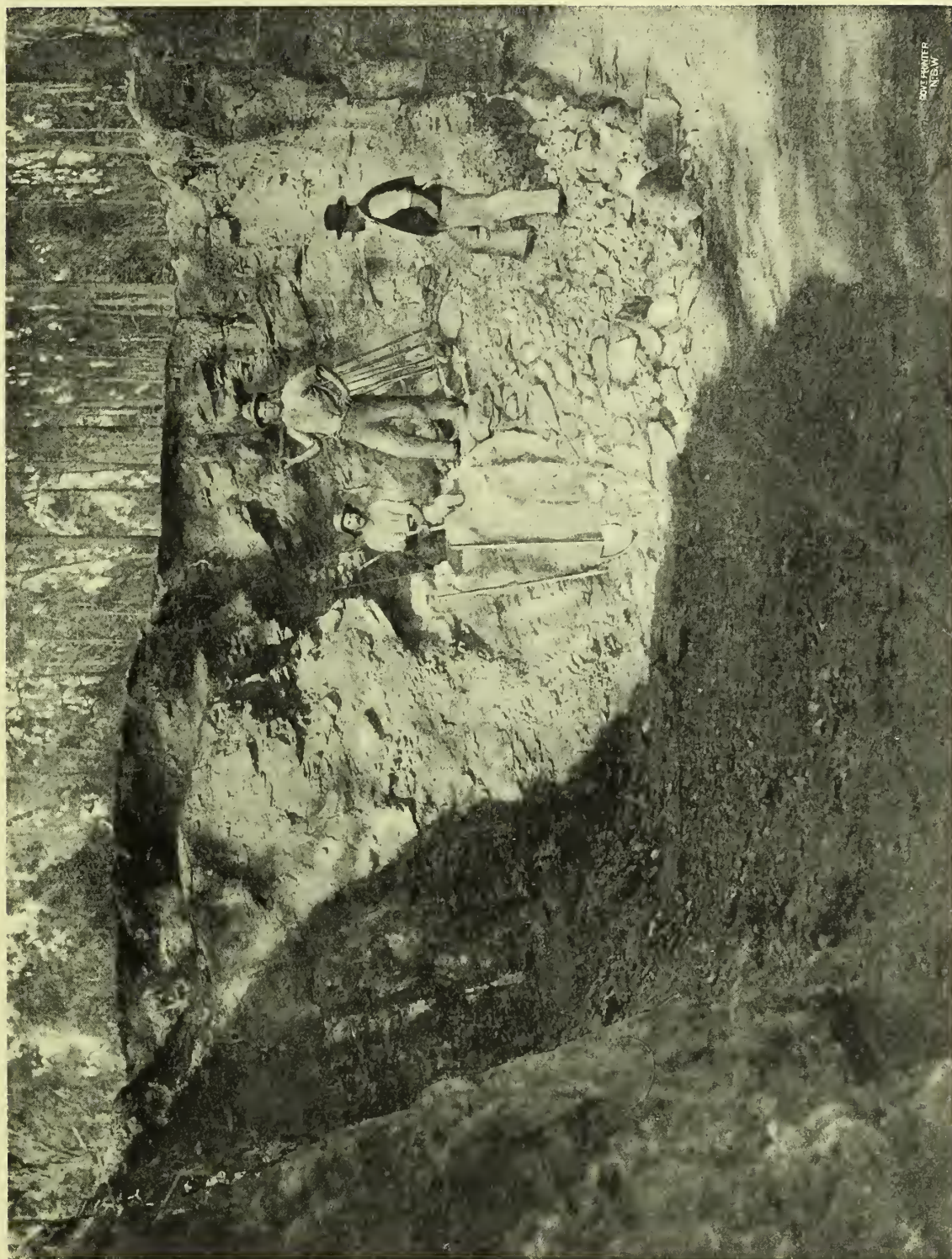
The Nine Mile Deep Lead Company succeeded in bottoming its shaft and proving the existence of a deep lead under the basalt. The shaft bottomed slightly high, and consequently it cannot be said whether the lead is payable or not, but the indications are considered to be encouraging.

The yield of tin obtained by the dredge at Cope's Creek has been up to expectations, but it was found that a larger plant, with more efficient saving appliances, is necessary to enable the ground to be successfully treated, and steps in this direction have already been taken by those concerned in the venture. The dredge at Glen Elgin has also saved a quantity of tin as well as the gold. The dredge at Wylie Creek, up to the close of the year, only had a trial run, which is stated to have proved satisfactory.

The following table shows the quantity and value of tin exported from this State since the opening of the tin-fields in 1872 to the end of 1901*:

Year.	Ingots.				Ore.				Total Value	
	Quantity.		Value.		Quantity.		Value.			
	tons	cwt.	£	s. d.	tons	cwt.	£	s. d.	£	s. d.
1872	47	0	6,482	0 0	849	0	41,337	0 0	47,819	0 0
1873	911	0	107,795	0 0	3,660	0	226,641	0 0	334,436	0 0
1874	4,101	0	366,189	0 0	2,113	0	118,133	0 0	484,322	0 0
1875	6,058	0	475,168	0 0	2,022	0	86,143	0 0	561,311	0 0
1876	5,449	0	379,318	0 0	1,509	0	60,320	0 0	439,638	0 0
1877	7,230	0	477,952	0 0	824	0	30,588	0 0	508,540	0 0
1878	6,085	0	362,072	0 0	1,125	0	33,750	0 0	395,822	0 0
1879	5,107	2	343,075	0 0	813	15	29,274	0 0	372,349	0 0
1880	5,476	6	440,615	0 0	682	6	30,722	0 0	471,337	0 0
1881	7,590	17½	686,511	0 0	609	6	37,492	0 0	724,003	0 0
1882	8,059	0	800,571	0 0	611	0	32,890	0 0	833,461	0 0
1883	8,680	1	802,867	0 0	445	4	21,685	0 0	824,552	0 0
1884	6,315	16	506,726	0 0	349	13	14,861	0 0	521,587	0 0
1885	4,657	18	390,458	0 0	534	18	25,168	0 0	415,626	0 0
1886	4,640	18	449,303	0 0	326	18	18,350	0 0	467,653	0 0
1887	4,669	8	509,009	0 0	291	13	16,411	0 0	525,420	0 0
1888	4,562	2	569,182	0 0	247	8	13,314	0 0	582,496	0 0
1889	4,408	13	403,111	0 0	241	15	12,060	0 0	415,171	0 0
1890	3,409	11	317,117	0 0	259	4	12,724	0 0	329,841	0 0
1891	2,941	5½	261,769	0 0	203	5	9,643	0 0	271,412	0 0
1892	3,253	0	301,541	0 0	239	2	12,573	0 0	314,114	0 0
1893	2,636	17	223,139	0 0	148	1	6,604	0 0	229,743	0 0
1894	2,611	5	179,445	0 0	190	7	7,752	0 0	187,197	0 0
1895	2,199	11	136,080	0 0	77	4	2,543	0 0	138,623	0 0
1896	1,710	4	99,212	0 0	96	19	2,905	0 0	102,117	0 0
1897	1,140	13	70,128	0 0	14	2	560	0 0	70,688	0 0
1898	893	17	60,565	0 0	1	4	35	0 0	60,600	0 0
1899	821	15	98,138	0 0	4	15	290	0 0	98,428	0 0
1900	901	5	120,932	0 0	15	2	900	0 0	120,932	0 0
1901	656	8	76,851	0 0	10	17	464	0 0	77,315	0 0
Totals	117,224	13	10,020,421	0 0	18,520	18	906,132	0 0	10,926,553	0 0

* Includes tins refined from imported ores to the end of 1893.



THE LEVIATHAN TIN-LODE MINING COMPANY, INVERELL.
(No. 2 Cut, showing face of Lode.)

THE LEVIATHAN
MINING COMPANY
INVERELL



BECKETT BROTHERS' TIN MINE, THE PONDS, TINGHA.
(Twelve tons of Tin Ore were obtained from this heap of washdirt.)

The information given in the following notes on the tin-mining industry is taken from reports furnished by the Wardens and Mining Registrars:—

PEEL AND URALLA MINING DISTRICT.

Inverell-Tingha Divisions.

Although there has been a fair amount of prospecting and developing work done during the year in these Divisions, the return has not been quite up to expectations.

The Leviathan Tin Lode Mining Company's holding is situated about 5 miles from Inverell. The property consists of a lease of 72 acres, held under the Mining on Private Lands Act, and a dam site of 10 acres. The Company is registered and has a nominal capital of £30,000 in 60,000 shares of 10s. each, of which 20,000 are fully paid up, 30,000 are contributing, and 10,000 are held in reserve. The Company has a crushing and concentrating plant, valued at about £1,250, and during the year the average number of men employed has been fifteen. The work has been carried on under the open-cut principle, and the workings display an extensive formation of very promising appearance. There is a large body of ore of good quality in sight, and the possibilities of the mine are very considerable. Work was only in progress about six months of the year, during which time the plant and machinery was erected and 650 tons of ore treated, returning 15 tons of black tin. Further additions are about to be made in the way of buddles and settling pits, which it is thought will give a better extraction. This mine should ultimately give a handsome return to the shareholders.

The Dolcoath Lode Syndicate's property is situated about 5 miles from the Leviathan, and is supposed to contain a continuation of the same lode. The holding consists of a mineral lease of 40 acres, and the work done upon it has been more in the shape of prospecting; though no ore from it has been treated in bulk, the lode is of a promising character.

At Tingha, there has been a good deal of work going on during the year; there is more fossicking and prospecting done around about Tingha than in any other portion of the district, and some good results have been obtained. Mr. L. R. Litchfield, tin buyer, has kindly supplied the following figures respecting the tin ore purchased by him during the last five years, by which it will be seen the amount purchased last year is in excess of the previous years:—1897, 352 tons; 1898, 254 tons; 1899, 333 tons; 1900, 467 tons; 1901, 499 tons.

This would indicate that the output has been improving (although the return represents the tin ore locally purchased by Mr. Litchfield only), that for 1901 being valued at £32,000. Mr. Litchfield estimates the amount of tin ore purchased by other buyers at about 191 tons, valued at £13,000, and this makes the estimated total production for the year 690 tons, valued at £45,000.

There is always a considerable amount of prospecting and development work being done about Tingha. At Topper's Mountain, Middle Creek, Sutherland's Water, &c., prospecting is continually proceeding, and the Brickwood and Brickwood Extended, within about 3 miles of Tingha, are engaged in development work. Possibly no such rich patch as Brickwood and party's has been known in recent years. The work was confined to a 4 acre lease in shallow alluvial ground, the deepest sinking being 60 feet, and the yield obtained was 78 tons of tin ore, valued at £5,469. The party have lost the tin, but were, at the close of the year, sinking on a promising lode which had been discovered, and were down to a depth of 70 feet.

At "The Ponds" work is always being actively carried on, principally by the Beckett and Dunshea families, who are busily employed developing their leases. Besides these, there are a considerable number of prospectors spread over a large area of country.

Within about 2 miles of Tingha, on Cope's Creek, the Cope's Creek Dredging Company is at work, reference to which is made under the notes on dredging.

The next mining centre is Elsmore, which includes the Newstead mines, about 3½ miles distant. The year has been an unsuccessful one for Elsmore and surroundings, the results obtained being very indifferent.

One of the principal mines in the locality is held by the Union Tin Company, and consists of 1,060 acres of Mineral Conditional Purchases. This is an old mining property, which in days gone by turned out as much as 600 tons annually for several years. The whole of the Company's property is tin-bearing, and, though operations have been confined to working the alluvial, the ground is known to contain reefs of tin, bismuth, and wolfram. It is said to have been on this ground where the first tin was found on New England by a man named Wells, who was employed as a shepherd on Newstead station. The property has recently been taken over by Messrs. Brown, Cooper, & Co., who intend erecting a sluicing plant, and pumping the water from the McIntyre River.

At the Elsmore Valley Tin Mine, there has been very little work done, as the ground proved to be very irregular, and this made operations very slow. Towards the end of the year the country has been much more regular and better in quality. The yield for 1901 has been 42 tons, and much more satisfactory returns are expected during the present year.

Close to Elsmore village, Mr. J. H. Penberthy has been testing and prospecting the deep ground, with fairly good results.

On the whole it is anticipated that this year will bring forth better results from the Elsmore locality.

The Gilgai, which in past years has been the scene of active operations, is now almost dead. There are a few prospectors working about the locality, but the only mining being done is by James Watkins on his lease. Watkins has stuck very closely to this locality, and has worked hard and persistently all the year. It is said he has fairly good prospects and may yet receive the reward of his labour.

There appears to be every prospect of the current year being a far more prosperous one, as in all the mining centres there is an incentive towards carrying on more extensive work.

Glen Innes Division.

The returns indicate that the fossicking for tin has not been carried on with the energy of former years, and there appears to have been a great falling off in the production. It is estimated that about 5½ tons of ore were won, of a value of £275.

The Glen Elgin Gold and Mineral Dredging Company obtained a small quantity of tin in connection with dredging operations, details respecting which will be found under the notes on dredging.

Kookabookra Division.

A number of fossickers were engaged during the year about the old workings at Oban, Mitchell River, Paddy's Gully, and Nowland's Creek, and in addition to 170 oz. of gold they obtained some two tons of tin ore.

Armidale Division.

A few miners have been engaged prospecting for tin at Boorolong, but as no water has been available for washing there is no yield to record.

Bendemeer Division.

There were some fourteen men employed during the year in searching for tin. The quantity of ore obtained is estimated at 13½ tons, valued at £927.

It is anticipated that dredging operations will be started in this Division during the current year.

Bundarra Division.

Very little mining for tin has been done during the year in this district, the principal work being at Glen Dale, and as there is practically no prospecting being carried on, no increase in the output can be expected. It is estimated that 6½ tons of ore were won during the year, the value being £402.

NEW ENGLAND MINING DISTRICT.

Emmarille Division.

There is a considerable falling off in the quantity of tin won in this Division as compared with the previous year. The principal cause of the decrease was the temporary shutting down of the Ottery Mine after a period of 21 years' continuous work.

The

The Syndicate, known as the Mascotte, which was engaged in endeavouring to bottom a shaft in Kennedy's paddock, was compelled to cease operations early in the year, for, although equipped with a good plant, the water proved an unsurmountable obstacle.

This syndicate then took up 80 acres of freehold land at Glendlan, but after doing a lot of work, it was again beaten out by the water.

More men have been engaged working the alluvial ground than for some years previously, owing to the closing down of the silver and tin mines, where they were employed, and the various old diggings present a scene of unwonted activity, but the results obtained are very indifferent, and the prospects of the industry in this Division are anything but bright.

The quantity of ore won from all sources during the year was about 307 tons, valued at £18,000.

Deepwater Division.

Tin mining in this Division has not been so active as in the previous years, the long-continued drought having hindered prospecting and operations generally to a very serious extent.

The Nine Mile Deep Lead Tin Mining Company bottomed its shaft at a depth of 158½ feet, and proved the existence of a deep stanniferous lead. Although the prospects obtained cannot be said to show that the lead is payable, owing to the shaft having bottomed on slightly high ground, yet further operations will doubtless prove that such is the case. All previous efforts to bottom a shaft had failed, and the success of the Company has given a stimulus to several other parties in the locality.

The quantity of tin ore obtained in this Division is estimated at 200 tons, 50 tons being lode tin and 150 tons stream tin, the total value being about £12,000.

Wilson's Downfall Division.

The yield of tin ore compares favourably with the previous year. Operations have been generally of a fossicking character, although some prospecting work has been done on the flats and banks of creeks, and in some instances payable results have followed. Tin continues to be found at Amosfield, Cemetery Creek, Bookookoorara, Maryland, Two-mile Creek, Wylie Creek, and other minor localities. From present indications the output may be expected to be maintained during this year.

The Wylie Creek Tin Mining and Dredging Co. has erected a bucket-dredge at Wylie Creek, and the trial run has proved satisfactory. Beyond this no work had been done up to the end of the year, and owing to the want of water the dredge is now idle. The plant and dredge is valued at £7,000.

The estimated value of the production during the year is £4,500, the quantity of tin ore obtained being about 75 tons.

LACHLAN MINING DISTRICT.

Effield Division.

At Burra a few prospectors were engaged mining for tin during the year. Two men obtained 270 lb. of tin ore in five days, but the extreme drought rendered further operations impossible.

Wyalong Division.

The Buddigower Field is situated 12 miles in a south-westerly direction from West Wyalong. It is on the dividing range between the Lachlan on the east, and the Murrumbidgee on the west. In the early months of last year, John Smith, an old prospector, discovered a large tin lode, which he, with others, quickly secured, and some ten or eleven mineral leases have since been applied for by various parties.

Loose slugs of tin ore were found on and below the surface, and yielded upwards of 75 per cent. of metallic tin. The prospector raised 4 tons of ore, at some 2 to 8 chains away from the main find, which were sent to the works of the Sydney Smelting Company on the Parramatta River; 1 ton 10 cwt. yielded 18·7 per cent., and 2 tons 10 cwt. 6·6 per cent. of metallic tin, the two parcels giving a return of £39 6s. 3d.

Subsequently the prospector commenced to sink at the place where the tin slugs were found, and struck a rich vein, samples from which assayed 52 per cent. of metallic tin.

Where this discovery was made it was found that a large silver lode crossed the tin lode at right angles, running east and west, while the tin lode is north and south. Samples taken from this lode have assayed from 100 to 400 oz. to the ton.

It has been decided by adjoining holders to concentrate their labour, and open up the prospector's lease to prove the ground. On the west side the country is slate, and on the east granite. The tin is principally found in granite, and the silver in granite and slate.

Yalgogrin Division.

A mineral lease has been granted at the old tin mines 9 miles westerly from Yalgogrin. Stream tin was discovered, but, owing to the absence of sufficient water, it was impossible to work it. The lessee has machinery on the way to work the land by a dry process. If this be successful, a new industry will be added, which must give a great impetus to mining in this district.

TUMUT AND ADELONG MINING DISTRICT.

Germenton Division.

Mr. F. Heather reports that he obtained tin to the value of £45 10s. at Lankey's Creek, Yarara, by ground sluicing. The yield is poor, but the wash is said to be improving.

Tumbarumba Division.

The Burra Sluicing Company, in connection with its gold-sluicing operations at Burra Creek, obtained some 2 tons of tin ore, valued at £180, during the year.

HUNTER AND MACLEAY MINING DISTRICT.

Kempsey Division.

The improvement foreshadowed in last year's report has not been realised. The whole of the Carrai Leases were forfeited during the year for non-compliance with the labour conditions, and there is so little confidence in the ground that they have not been again taken up; indeed, the opinion is held that the ground is practically worked out.

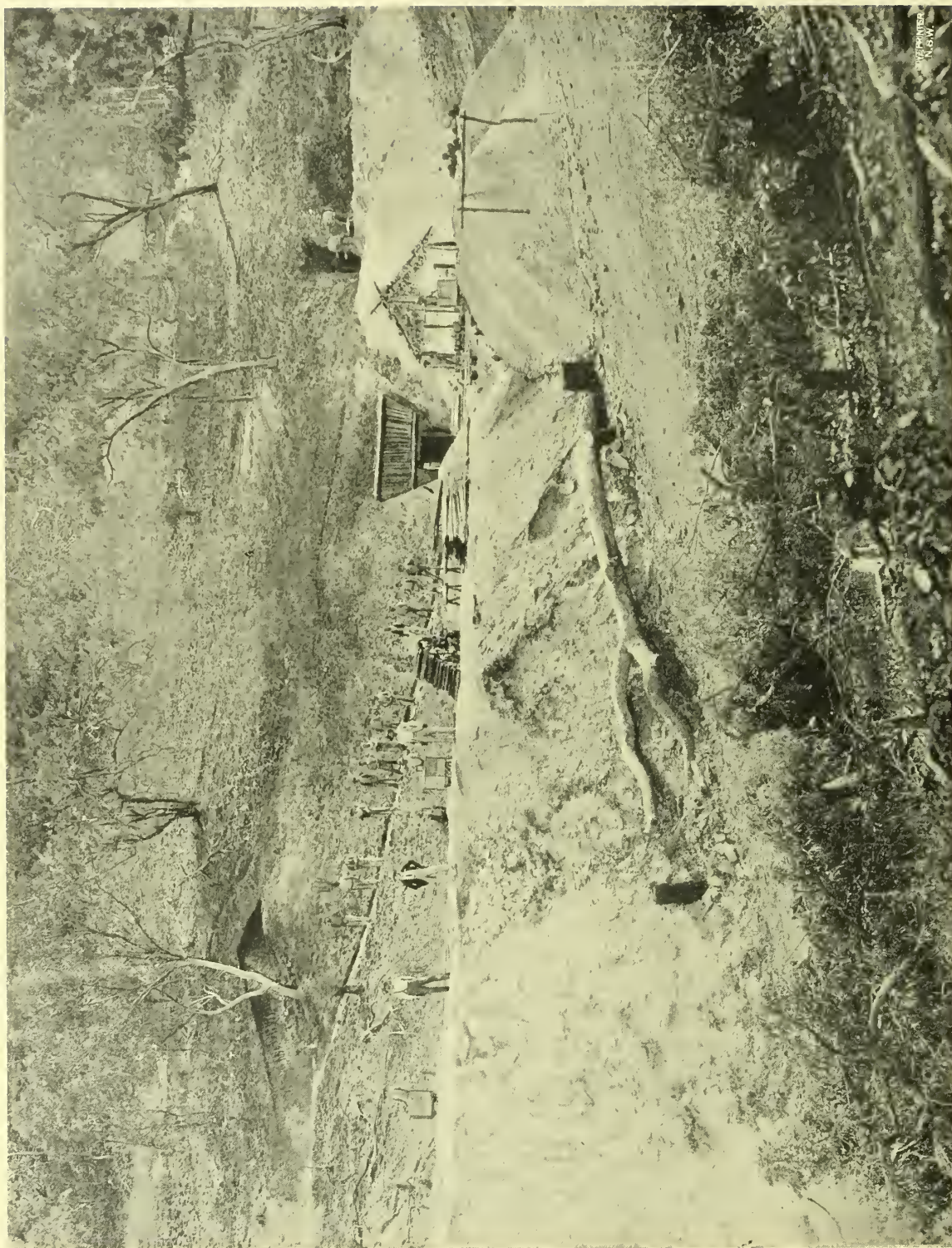
The Gundle Mines are still under suspension for want of capital, although some additional machinery has been placed on the ground during the year.

There are a few fossickers in the vicinity of Beechwood, but they have met with but little success.

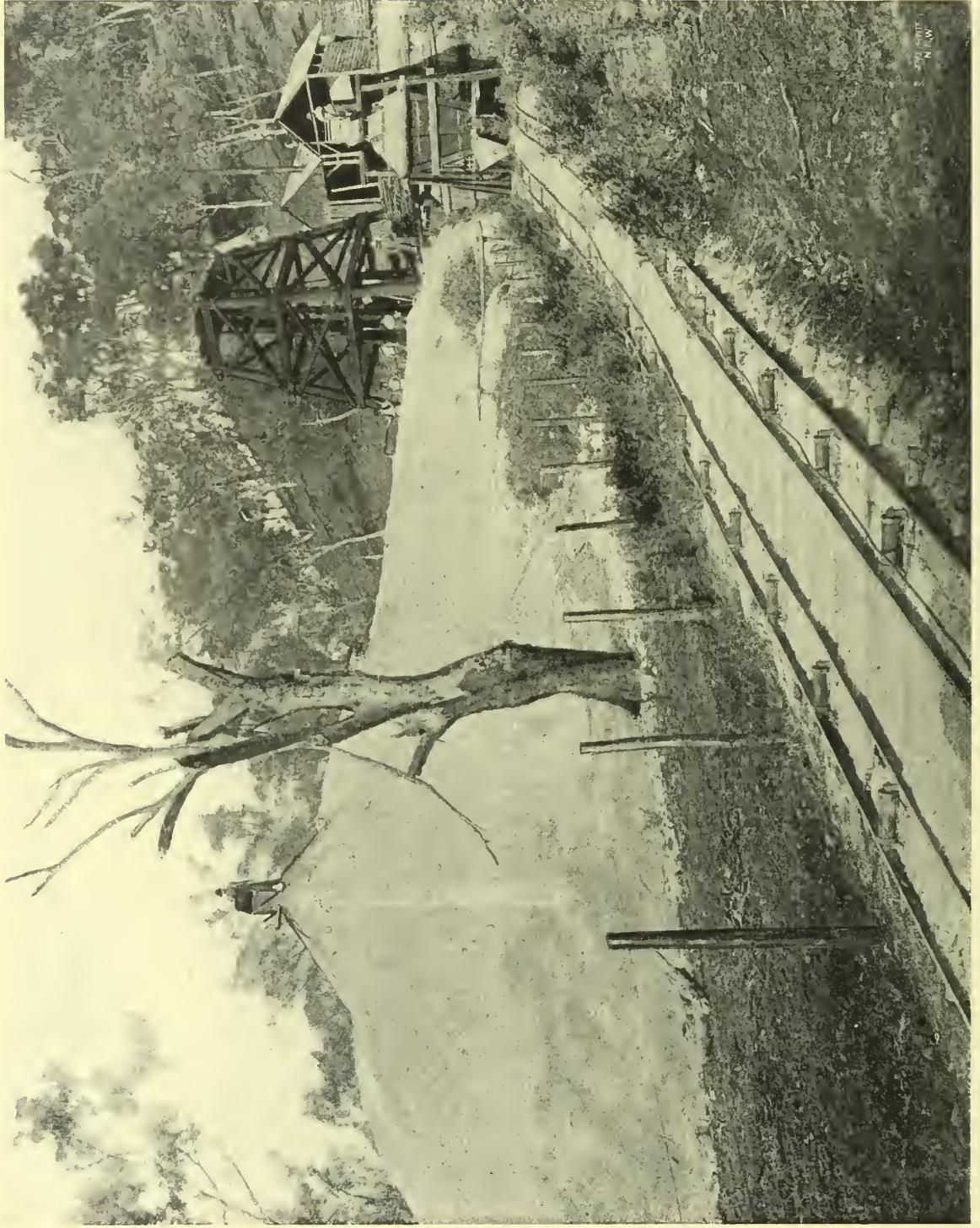
ALBERT MINING DISTRICT.

Broken Hill Division.

The only work done worth mentioning in this Division has been at the "Wheal Byjerkerno," where some twelve men are engaged. A small plant to treat the ore is shortly to be erected. The Government Geologist inspected the mines during the year, and his report appears in the appendix to this volume.



MALACCA DIAMOND MINE. INVERELL.



STAR OF THE SOUTH DIAMOND MINE, INVERELL (SKIPPING'S SHAFT).

DIAMONDS.

It is estimated that 9,322 carats of diamonds, valued at £9,756, were won during the year, the whole of which were obtained from the Copeton (Boggy Camp) Field.

The output shows a decrease as compared with that of the previous year, but there is an increase in value consequent on the higher price obtained for the stones; all the diamonds offered have commanded a ready sale.

The decrease in the production is due to the depletion of some of the rich gravels previously worked, and to operations at the mines held by the Inverell Diamond Fields' Company, and the Malacca Company being largely confined to development during the year.

The Inverell Diamond Fields Company, it is stated, entered into a contract for the sale of all the diamonds obtained in its mines at a low figure, and this naturally had a restraining influence upon the output, but now that the contract is at an end it is expected that operations will proceed with increased vigor, and that the diamonds won will realise three times as much as previously. The company commenced washing on an extensive scale in the month of November, and a considerably augmented output may be looked for during the present year.

The following table shows, approximately, the quantity and value of diamonds won in this State to the end of 1901:—

Year.	Diamonds.	Carats.	Value.	Year.	Diamonds.	Carats.	Value.
			£ s. d.				£ s. d.
*1867-85	12,000	2,856	2,952 0 0	1895	4,100	1,313†	492 7 0
1886	23,000	5,151	5,151 0 0	1896 .....	.....	8,000	2,625 0 0
1887	205	42†	26 5 0	1897 .....	.....	9,189	3,250 0 0
1888** .....	.....	.....	.....	1898 .....	.....	16,493	6,059 13 6
1889 .....	.....	2,195‡	878 5 0	1899 .....	.....	25,874	10,349 12 0
1890 .....	.....	731½	335 0 0	1900 .....	.....	9,828½	5,663 1 0
1891 .....	.....	1,200	1,050 0 0	1901 .....	.....	9,322	9,756 0 0
1892	2,285	457¼§	469 0 0				
1893 .....	.....	15,000||	15,375 0 0	Totals ...	.....	109,425‡	£65,290 17 0
1894 .....	.....	1,772¼||	858 13 6				

* Estimated. † Result only of 19½ loads washed in January (Cope's Creek). ‡ Output of Malacca Co. (Inverell) only. § From "Monte Christo" mine (Bingara) alone. || Output from Bingara only. ¶ From Boggy Camp (Tingha) only. ** No information obtainable.

NOTE.—This table is compiled from such information as is available, but is believed to considerably understate the actual output.

The following notes on the diamond-mining industry are taken from the Wardens' reports:—

Tingha Division.

The Inverell Diamond Field Company is situated at Copeton, better known as "Boggy Camp." This is a London company, consisting of 450,000 shares of £1 each, and the property comprises 467 acres held under mineral leases. The mine is well equipped with washing-plant, puddlers, and elevators, driven by a 25-H.P. boiler and engine, &c., &c. During the past year the mine has been under the management of Mr. C. Barrington Brown, who, having got everything into complete working order, shortly relinquishes the management and returns to England, his place being taken by Mr. Parker. Development work has been zealously carried on during the year, but it was not till the month of November that washing on an extensive scale was commenced; the mine is now in full working order, and the company should reap a good return for the money expended.

Within about 5 miles of the Inverell Diamond Field is The Malacca, which consists of 60 acres held under mineral leases, and 120 acres under mineral conditional purchases. It is an English company of 125,000 £1 shares, and is virtually the same proprietary as the Inverell Diamond Field Company. There is no machinery on the mine, but development work has been carried on under the supervision of Mr. Barrington Brown, who will be succeeded by Mr. Vivian.

The Elliott Diamond Company is understood to have had a very good year, but no return respecting the output is available for publication.

The Soldier's Hill Mine has been worked out, and the plant removed to a prospecting area at Staggy Creek.

It is estimated that diamonds, in addition to those won by the companies, to the value of £4,300 were obtained by fossickers and prospectors during the year.

Bingara Division.

The mines in this Division are at a complete standstill. The Australian Diamond Mining Proprietary Company is taking steps to remove its plant, and has done no work during the year.

The New South Wales Search Syndicate has suspension of the labour conditions granted for the whole of the year, and none of the other mines have done anything in the way of winning diamonds.

Corra Division.

During the year a few diamonds were found in an alluvial deposit adjacent to the Abererombie River, near Mount McDonald, and some of the stones were stated to be of high value.

Gulgong Division.

No work has been done during the year on the mineral leases at Beryl, on the Cudjegong River.

OPAL.

The mining for opal has been carried on at the White Cliffs field with a greater degree of activity than in the previous year. Towards the close of the year a mild "rush" set in, the miners coming from all parts, but chiefly from the Broken Hill and Cobar districts.

The Warden, after making minute inquiries from the company and the leading opal buyers, has valued the output for the year at between £120,000 and £150,000, and the lower estimate has been adopted, it being considered as coming well within the mark.

In the Amending and Consolidated Mining Bill as laid upon the table of the Legislative Assembly, provision was made to license all persons purchasing gold, diamonds, opal, or other precious stones; and, at a public meeting held at White Cliffs, on January 27th, 1901, a resolution was passed that Clause 103 of the Bill, embodying such provision, was calculated to cripple the opal industry, and it was asked that it be withdrawn until such time as the Government appointed a Special Commission to visit the field and collect evidence to enable the Government to frame a Bill, which would serve the best interests of opal mining, and assist in its development. This resolution was subsequently supported by a petition representing 689 persons engaged in or dependent upon the industry; and it was decided, in view of the importance of the issues involved, and the fact that a Departmental Committee would not have the power to compel the attendance of witnesses or to take evidence on oath, to appoint a Royal Commission to institute full inquiry, and to make suggestions and recommendations as might be deemed advisable.

The Commission appointed consisted of Mr. E. F. Pittman, Government Geologist; Mr. J. W. Fletcher, Warden for the District; and myself (as President).

In terms of the Commission we were required "to inquire (1) into the existing condition of matters in connection with the mining and the sale of opal on the White Cliffs Opal Fields, and report as to the best method of regulating the industry; (2) as to whether the provisions of the Mining Bill, 1900, relating to the mining and sale of opal, are suitable; and, if necessary, to suggest in what respect they should be amended or added to; (3) as to the advisableness of inserting special provisions in the Mining Bill, 1900, to regulate the making and the terms of tribute contracts in connection with mineral leases of opal country; and to make any other recommendations deemed advisable.

In virtue of this appointment, the Commission made an examination of the field, and the nature of the mining operations conducted there; the views and opinions of all persons interested were also fully obtained.

The report of the Commission was presented in July last. The Commissioners state that the estimates given by the different witnesses tend to show that the average annual sales of opal on the field for some years past have amounted to about £100,000; and although those locally interested considered the place as fully manned, the Commissioners ventured the opinion, in view of the prices obtainable for opal, the extent of the open land untried, and the profits to be made by mining it, that the field could well maintain a larger population.

The result of the investigation of the Commissioners, and the opinions which, after careful deliberation, they formed on the several questions dealt with are summarised by the following recommendations:—

- (1) That the Government should offer to redeem the unexpired portion of the leases now held by the White Cliffs Opal Mines, Limited (300 acres in all).
- (2) That if this be effected the land be vested in the Crown, and thrown open for mining in small areas under miner's right or mineral license.
- (3) That in the event of the company not coming to terms with the Government, it be a recommendation to the company that in lieu of the tribute system a small weekly rental should be charged for the privilege of working on its blocks under agreement, which agreement should not be made for a shorter term than three months.
- (4) That a rigid system of registration of all opal buyers, cutters, and polishers, be enforced under conditions outlined by the Commissioners, and that the fee for registration should be nominal.
- (5) That provision be made in the new Mining Bill for the proper registration of all business or residence areas, claims, or shares in claims, upon the White Cliffs Opal Field, at a nominal fee, say, 1s., and within two months of possession.
- (6) That no opal buyers, cutters, or polishers, be allowed to hold claims or interest in claims on the field.
- (7) That prospecting under Government aid should be encouraged in the district.
- (8) That no more mineral leases be under any circumstances issued in the White Cliffs opal-bearing district, and that no claim be allowed in excess of 100ft. square.

The

The offer of purchase by the Crown was accordingly made to the company's representative, who transmitted it to his directors in London, from whom, however, a definite reply has not yet been received, consequently the proposal to revest the land in the Crown, to be thrown open in small areas under miner's right, is still in abeyance. The alternative recommendation, which it was intended to make to the company, has, however, been anticipated, and the rental system was, shortly after the Commission visited White Cliffs, voluntarily adopted by the company, and is said to be working well.

Prospecting for opal was carried out in several other districts, notably at Rocky Bridge Creek, Trunkey district, and the Warrambungle Mountains, Coonamble Division, but in no instance was payable gem stone disclosed.

The following remarks are taken from the report of Mr. Warden Holcombe, on the White Cliffs field:—

White Cliffs is now a populous and busy town, containing, by the recent police census, 2,300 inhabitants; and this number is being increased almost daily by arrivals from all parts of Australia, but more especially from Broken Hill and Cobar.

The town is badly situated in an unhealthy position at the base of a hollow, being surrounded on nearly every side by high ground, and in consequence the heat in summer time is excessive. The Warden is of opinion that, even if no other opal-bearing ground be discovered in the vicinity (which is, to say the least, extremely improbable), there is sufficient known opal country in sight to last the town for the next five years; and in this view the Warden is supported by many old and experienced miners.

At present the area being worked, commencing at the Company's blocks, extends north from the town along the tableland for fully four miles, but the miners are continually shifting from one block to the other, as their fancy takes them, or in consequence of some rich patch being struck.

The seven blocks held by the White Cliffs Opal Mining Company are always the favourite ground with the miners, as the soft opal-bearing kaolin is met with directly at the surface, while in most of the other ground a hard stratum of rock 10 or 12 feet in thickness is superimposed, and on this area some 440 men find employment.

The men working on the various other areas at the date of the Warden's visit were approximately as follows:—On Block 11 (Grady and Co.'s), good ground, 80 men; on Block 9 (known as Brady's), 30 men; on Block 2 (McKenzie's), good ground, 40 men; on Block 14 (Ronald and Dromgoole's), 70 men; on Block 25 (Barrett's), to the north, 5 men; on claims outside leases, about 100 men; on Farley's Hill, half-mile east of town, 50 men; on Smith's Hill, half-mile south-east, 20 men; on Sullivan's Hill, 3 miles north, 50 men.

South of the town, opal has been traced through the Double Tanks and across Bunker's Creek to a spot about 12 miles out on the Euriowie-road, where a few men are obtaining fair opal, about 30 men being distributed over the whole area. The field is thus providing employment for over 900 men, and this number is increasing daily.

It is very hard to arrive at a true estimate of the value of opal won, especially as during the greater part of the year the seven blocks of 300 acres held by the White Cliffs Opal Mines, Limited, were let in claims to miners at a 15 per cent. tribute, under which system it is beyond all doubt that the miners failed to hand over most of the opal obtained by them. This will be apparent from the return of the Company, in which it is shown that the value of the opal passing through its books during the first eight months of the year amounted only to £6,000, while a low estimate of the value of the opal won on the blocks in question during that time would be from £50,000 to £60,000. Owing to this, the Company have abolished the tribute system, and now, under a special form of agreement, allow the men to peg out a claim of 45 feet x 45 feet on the Company's leases, on payment in advance of a weekly rental of 2s. 6d., the miner keeping all the opal he may find. At present this system is working well, and over 400 men have registered under it.

Owing to parcels of opal passing frequently through several hands before finally leaving the field, it is impossible to arrive at the correct value of the total amount won, but from statements made by the officials of the Company and by the leading buyers it may safely be fixed at from £120,000 to £150,000 for the year.

The manager of the Company states that the average depth at which gem opal has been struck is from 25 to 35 feet, and that so far none has as yet been found below the 43-foot level, although trial shafts have been sunk on Block 4 to 70 feet, on Block 6 to 80 feet, and on Block 8 to 70 feet.

This table shows the estimated value of Noble Opal won in this State to the end of 1901:—

Year.	Value.	Year.	Value.	Year.	Value.
	£		£		£
1890	15,600	1895	6,000	1900	80,000
1891	.....	1896	45,000	1901	120,000
1892	2,000	1897	75,000		
1893	12,315	1898	80,000		
1894	5,684	1899	135,000	Total	£576,599

IRON AND IRON-ORE.

Considerable attention is still being directed towards the question of establishing ironworks in this State, capable of supplying the requirements of Australia.

Two important schemes are being advocated—one to smelt ore at Lithgow, from the Carcoar, Cadia, and possibly other deposits, in the Western District, and the other to bring ore over the sea from the Blythe River, Tasmania, and smelt it in the vicinity of Sydney, or elsewhere, upon the sea-board.

The Lithgow district is fortunate in possessing abundant supplies of good coal and limestone, and Mr. Geological-Surveyor Jaquet, in his recently published memoir, estimates that at Carcoar and Cadia the quantities of rich ore in sight are respectively 3,100,000 and 39,000,000 tons. Mr. Jaquet points out that the pig-iron produced from the Carcoar ore would be admirably adapted for foundry purposes, and that it is suitable for use in the basic process of steel manufacture.

The ore at Cadia contains little phosphorus, and could be utilised in the manufacture of steel by the cheaper acid processes. Some of this ore is remarkably pure, but much of it contains appreciable quantities of both sulphur and copper,

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The deposits at Blythe River, Tasmania, have recently been inspected by Mr. W. H. Twelvetreets, Government Geologist of that State, who estimates that the deposit contains 17,291,000 tons of "marketable" ore, containing from 46 to 61·7 per cent. of iron, 1·6 to 34·2 per cent. silica, and 0·04 to 0·09 per cent. phosphorus.

The indications all point to the fact that extensive iron smelting-works will, at no distant date, be established in this State, and employment found for a great number of hands.

Work at the Eskbank Ironworks, Lithgow, has been most actively carried on during the year, and the proprietor, Mr. Sandford, reports, that the quantity of finished iron, castings, galvanised corrugated iron, bolts, spikes, black sheets, and bar-iron, manufactured from scrap, &c., totalled 7,737 tons, and the wages paid amounted to £39,586.

The following table shows the quantity and value of Finished Iron, Pig Iron, &c., made in this State from rolled scrap iron, &c., to the end of 1901 :—

Year.	Quantity.	Value.	Year.	Quantity.	Value.
To end of	tons.	£		tons.	£
1880	4,340·30	69,486	1892	2,782·17	22,605
1881	6,560·40	47,871	1893	2,190·56	14,786
1882	7,476·00	37,224	1894	2,368·30	17,170
1883	3,434·13	26,908	1895	2,403·15	15,620
1884	3,759·12	24,572	1896	4,721·00	33,283
1885	4,175·79	25,793	1897	3,239·00	21,862
1886	3,685·87	19,068	1898	5,200·00	42,250
1887	2,797·43	14,543	1899	6,500·00	55,500
1888	3,747·10	23,721	1900	7,737·00	95,000*
1889	2,136·90	18,331	1901	10,424·00	123,750*
1890	3,413·44	39,949	Totals.....	97,217·47	£825,393
1891	4,125·81	36,101			

* This is the estimated value placed on the product by the Department.

The quantity of ironstone mined for flux at Carcoar, Marulan and Picton, shows a considerable decrease as compared with the previous year. The estimated quantity of iron-stone flux raised in 1899, 1900 and 1901, respectively, is as follows :—

	Tons.	Value.
		£ s.
1899.....	10,521	8,417 8
1900.....	13,146	10,945 0
1901.....	4,136	3,536 0
Total.....	27,803	£22,898 8

The amount of iron oxide exported during the year exhibits a marked falling off from that of the previous year. A large quantity was raised during the year and disposed of for flux, but no record respecting the extent of the actual operations has been obtained. The following table shows the quantity and value of the iron oxide exported from this State to the end of 1901 :—

Year.	Quantity.	Value.	Year.	Quantity.	Value.
	tons.	£		tons.	£
1885	449·95	1,569	1894	432·90	670
1886	.....	.....	1895	152·35	348
1887	.....	.....	1896	375·40	801
1888	.....	.....	1897	230·05	536
1889	489·05	1,329	1898	391·95	832
1890	455·30	884	1899	396·35	846
1891	228·75	434	1900	313·50	686
1892	453·15	869	1901	128·55	229
1893	1,259·95	1,526	Totals.....	5,757·20	£11,559

LIME AND LIMESTONE.

The mining of limestone in the Capertee Division is assuming important dimensions. The Commonwealth Portland Cement Company is erecting extensive works capable of producing 20,000 tons of cement per annum, and employment will be found for a good many hands. The Ben Bullen Syndicate has commenced operations and is making provision for an increased output. Haigh's limestone and lime-works has been kept constantly employed, and a large quantity of limestone has been won from the quarries. A considerable amount of limestone has been raised by the company at Excelsior, and the stone has been despatched to the works at Granville for the manufacture of cement.

In the Bulladelah, Broken Hill, Blayney, Goulburn, Parkes, Rockley, and Taree Divisions, limestone is reported as having been raised and a quantity of lime produced.

The quantity of lime reported as having been produced to the end of 1901 is as follows :—

	Tons.	Value.
To end of 1899*	1,162	£2,473
1900	9,528	9,198
1901	20,855	16,247
Total	31,545	£27,918

* quantity exported only.

The following table shows the quantity and value of limestone raised for flux, &c., in this State to the end of 1901 :—

Year.	Quantity.	Value.	Year.	Quantity.	Value.
	tons.	£		tons.	£
1890	41,436·8	41,989	1897	67,590·0	41,798
1891	74,057·0	65,357	1898	9,253·0	5,783
1892	103,368·0	93,031	1899	1,000·0	750
1893	130,635·0	111,041	1900	17,000·0	3,962
1894	89,990·0	69,290	1901	26,570·0	5,794
1895	104,194·0	68,160			
1896	88,924·0	54,261	Totals	754,017·8	£561,216

ANTIMONY.

The production of antimony has been confined to the Hillgrove mines, where stibnite is associated with the auriferous lodes, and adds considerably to the difficulty of extracting the gold contents.

The following table shows the quantity and value of antimony (metal and ore), the product of this State, exported to the end of 1901 :—

Year.	Quantity.	Value.	Year.	Quantity.	Value.
	tons. cwt.	£		tons. cwt.	£
To end of					
1880	564 7	11,830	1892	728 5	14,680
1881	539 4	17,346	1893	1,774 0	25,092
1882	1,068 18	16,732	1894	1,250 7	18,744
1883	375 11	5,555	1895	478 16	7,251
1884	433 12	6,458	1896	132 15	1,834
1885	292 15	4,296	1897	169 2	3,612
1886	273 3	3,381	1898	82 7	916
1887	168 7	1,641	1899	326 10	2,694
1888	190 7	2,918	1900	248 8	2,429
1889	221 8	3,344	1901	88 3	1,183
1890	1,026 0	20,240			
1891	914 17	22,057	Totals	11,347 2	£194,233

BISMUTH.

The consumption of bismuth in the Arts is very limited, and the market is carefully regulated by the Bismuth Association, so that it is only possible to dispose of small parcels.

The output of this State is drawn from Jingera, Kingsgate, and Nanima, with occasional parcels of a few pounds' weight from Pheasant Creek, and Mole Tableland, in the New England District.

Subject to certain conditions, chiefly upon the character of the ore apart from its bismuth contents, small lots of ore can be sold in Sydney, the value varying with the market price of the metallic (refined) bismuth.*

At this date (February, 1902) the buying price of an accepted ore containing 20 per cent. of metallic bismuth would be at the rate of 2s. per pound of bismuth contents. This rate increases slightly with the richness of the ore, and falls rapidly in the case of poorer ores. A 5 per cent. ore is saleable, but it is doubtful if it would pay expenses. If any considerable quantity of ore were brought forward, it would disturb the market, and cause a fall in prices; hence the restricted output.

The quantity of bismuth, metal and ore, exported during the year was 20 tons 16 cwt., valued at £6,665, and shows an increase in value of £1,025 on the exports for the previous year.

* In January, 1897, the price of metallic bismuth was advanced to 5s. a pound, and in July, 1900, to 7s. 6d. a pound; in March, 1901, it dropped to 6s., and in July of that year to 5s., at which price it stands at date.

The following table shows the quantity and value of bismuth (ore and metal), the product of this State, exported up to the end of 1901:—

Year.	Quantity.	Value.	Year.	Quantity.	Value.
To end of	tons cwt.	£		tons cwt.	£
1880	14 16	2,852	1892	14 5	1,080
1881	12 10	2,729	1893	6 0	402
1882	2 14	162	1894	9 0	480
1883	3 14	650	1895	2 9	164
1884	14 7½	2,770	1896	41 0	490
1885	14 3½	3,700	1897	3 2	800
1886	20 18	3,870	1898	29 7	4,615
1887	36 11	6,695	1899	15 11	3,355
1888	18 1½	3,911	1900	10 14	5,640
1889	42 10	11,349	1901	20 16	6,665
1890	2 2	306			
1891	0 8	500	Totals	334 19½	£63,185

CHROME.

The estimated production of chrome for the year is 2,483·40 tons, valued at £7,774, showing a decrease of 801·95 tons, and £1,053 in value, as compared with the previous year.

The output is contributed by the mines worked by Messrs. Quilter and Morley at Gobarralong, in the Gundagai Division. The small deposits in this locality, which in the past helped to swell the production, have been mostly worked out.

Mr. Geological-Surveyor Jaquet inspected the deposit at Bowling Alley Point, in the Nundle Division, during the year, and he describes the ore as occurring in pockets in the serpentine, as at Gundagai. A parcel of a few tons of ore was sent to Sydney, and is stated to have contained 47 per cent. of chrome oxide. Mr. Jaquet is of opinion that a considerable quantity of rich ore could be secured by judicious grading; but, as in the case of most of our other known deposits, it is doubtful whether the margin of profit would permit of the ore being economically worked, owing to the distance from the nearest railway station.

It is understood that attention is being devoted to the concentration of low grade chrome ore, and that some measure of success has been achieved.

The following table shows the quantity and value of chrome ore, the product of this State, exported up to the end of 1901:—

Year.	Quantity.	Value.	Year.	Quantity.	Value.
	tons.	£		tons.	£
1882	100·00	325	1898	2,110·90	6,301
1883-93	.....	.....	1899	5,292·70	17,416
1894	3,034·30	12,336	1900	3,285·35	11,827
1895	4,229·45	13,048	1901	2,483·40	7,774
1896	3,851·75	11,280			
1897	3,379·55	10,269	Totals	27,717·40	90,576

COBALT.

Operations were continued at Port Macquarie throughout the year with fair results. The mines were taken over on option by an English syndicate in November, and it is proposed to carry out further works on a much extended basis.

The ore at present raised, before being shipped, is washed in flumes, graded over screens, weathered, and then reworked and sorted, the concentrates consisting essentially of cobaltiferous wad.

The following table shows the quantity and value of cobalt ore, the product of this State, exported to the end of 1901:—

Year.	Quantity.	Value.	Year.	Quantity.	Value.
	tons.	£		tons.	£
1891	1·15	470	1898	116·85	560
1892	76·00	1,110	1899	189·95	899
1893	26·00	305	1900	143·25	1,590
1894	2·50	10	1901	110·60	1,051
1895	5·50	26			
1896	.....	.....	Totals.....	671·80	6,021
1897	.....	.....	

MANGANESE.

No serious mining appears to have been done during the year for manganese ore, and the quantity recorded as having been exported is inconsiderable, although it is understood that ores containing a high percentage of binoxide of manganese are still in demand.

The following table shows the quantity and value of manganese ore, the product of this State, exported up to the end of 1901 :—

Year.	Quantity.	Value.	Year.	Quantity.	Value.
	tons.	£		tons.	£
1884	200·00	560	1896	.....	.....
1885-89	.....	.....	1897	.....	.....
1890	100·00	325	1898	1·00	5
1891	138·20	340	1899	.....	.....
1892	15·80	47	1900	18·00	46
1893	.....	.....	1901	12·00	24
1894	13·50	44			
1895	3·35	10	Totals	501·85	£1,401

MOLYBDENITE.

This mineral is recorded as having been raised in marketable quantities at Kingsgate only during the year, where it occurs associated with the ores of bismuth. It is separated from the gangue by careful picking, screening, &c., as concentration processes do not appear to be successful.

About 6 miles west of Bolivia railway station, a number of reefs and large bunches of arsenical pyrites occur associated with very small quantities of molybdenite and wolfram. A few tons of stone have been broken out, but none has been treated.

At date (February 1902), £100 per ton is offered in Sydney for clean ore. The demand is not large, and the market is easily disturbed, but more ore could be taken than has been available.

PLATINUM.

It is estimated that 389 oz. of platinum, valued at £779, were won in the Fifield Division during the year; this is a decrease of 141 oz. and £238 in value as compared with the previous year. Owing to the drought prevailing in this district, the work has been very spasmodic, and prospecting has been well nigh impossible, with the result that no new discoveries have been reported. The known deposits in this district unfortunately give evidence of depletion.

The increasing demand for this metal has led to some 130 acres being taken up under lease at McAuley's Lead, about 20 miles from South Woodburn, where the auriferous beach sands, which also contain platinum, have been worked by beachcombers for many years.

Possession of the old platinum claims at Little Darling Creek, and Mulga Springs, in the Broken Hill District, has again been secured, and they are to be thoroughly prospected. Ore carrying a small proportion of platinum is found distributed over a very wide area in these localities, but so far the metal has not been obtained in payable quantity.

The following table shows the quantity and value of platinum won in this State up to the end of 1901 :—

Year.	Quantity.	Value.	Year.	Quantity.	Value.
	oz.	£		oz.	£
1894	1,060	1,390	1899	638	1,070
1895	413	475	1900	530	1,007
1896	2,438	3,479	1901	389	779
1897	1,966	2,949			
1898	1,250	2,062	Totals	8,684	£13,211

ALUNITE.

The Australian Alum Company considerably increased the output of alunite from its quarries at Bulladelah during the year. The deposit is a most extensive one, and the alunite, which is of great purity, is shipped for treatment to the company's works at Runcorn, in England, the quantity exported during 1901 being 3,146 tons, valued at £9,438.

The following table shows the quantity and value of alunite, the product of this State, exported to the end of 1901 :—

Year.	Quantity.	Value.	Year.	Quantity.	Value.
	tons	£		tons.	£
1890	220·0	3,000	1897	724·5	2,172
1891	704·0	1,888	1898	2,941·0	8,823
1892	821·0	3,284	1899	921·0	2,763
1893	1,284·0	5,136	1900	1,915·0	5,745
1894	862·0	3,448	1901	3,146·0	9,438
1895	832·0	3,328			
1896	1,872·0	4,116	Totals	15,742·5	£53,141

CLAYS.

A quantity of kaolin (china clay) was raised in the vicinity of Ulladulla during the year. It is being used in the pottery works of Messrs. Bakewell Brothers, at Erskineville, and has to some extent replaced the clay hitherto imported.

No record is obtainable of the actual quantity of clay won during the year, but the following table shows the quantity and value of the fireclay exported from this State, up to and including the year 1901 :—

Year.	Quantity.	Value.	Year.	Quantity.	Value.
	tons.	£		tons.	£
1891	16·80	55	1898	14·35	32
1892	35·00	80	1899	26·95	66
1893	21·00	46	1900	29·70	109
1894	24·00	60	1901	16·70	35
1895	19·50	55			
1896	34·15	69	Totals	238·15	£607
1897	.....	.....	

GRAPHITE.

About 350 tons of graphite were raised and disposed of during the year by Mr. D. G. Smith from his mine at Undercliff, in the Wilson's Downfall Division. The shaft has been sunk to a depth of 50 feet on the underlay, and the seam is about 2 feet wide.

On another holding, some 10 chains distant, a tunnel has been driven for a distance of 120 feet to prove the lode, and efforts are being made to form a company to develop the property.

Mr. Geological-Surveyor Andrews visited these deposits during the year, and his notes on their occurrence will be found in the Appendix to this Report.

SUNDRY MINERALS AND ORES.

The fall in the value of tungsten ores from the high prices ruling in the previous year to a more normal figure had the effect of checking operations, and the value of the quantity exported during the year is set down at £163.

The cinnabar deposit in the parish of Ewengar, Drake Division, has been still further prospected during the year, and negotiations are said to be proceeding for the erection of a plant to treat the extensive body of low-grade ore. At Carwell, in the Rylstone Division, a considerable amount of prospecting was done, but the work failed to prove the existence of any payable ore.

Although there are extensive deposits of marble in many parts of this State, only a comparatively small quantity is marketed. The principal output is furnished by Mr. T. J. Robinson from his quarry at Caleula, the squared blocks being sent to his works at Orange, which are equipped with sawing and polishing

polishing machinery. Good marble has also been obtained at Moparrabah, on the Upper Macleay, and a few blocks have been sent to the monumental masons in Sydney, but the expense of carriage militates against the establishment of a permanent industry.

The following table shows the quantity and value of sundry unclassified minerals and ores, the product of this State, exported up to and including the year 1901:—

Year.	Quantity.	Value.	Year.	Quantity.	Value.
To end of	tons.	£		tons.	£
1880	354·00	10,127	1892	92·25	1,158
1881	15·25	1,020	1893	66·60	557
1882	7·00	979	1894	.....	892
1883	31·00	160	1895	.....	4,637
1884	.....	.....	1896	68·01	924
1885	456·76	7,820	1897	.....	8,125
1886	69·22	5,327	1898	60·95	2,021
1887	1,431·00	15,624	1899	132·80	4,970
1888	119·30	3,438	1900	192·30	5,156
1889	95·85	719	1901	48·25	2,029
1890	233·00	7,252			
1891	788·95	3,217	Totals .....	.....	£86,152

LEGISLATION.

MINING LAWS AMENDMENT ACT 1901 (RENEWAL OF LEASES).

This Act was passed during last Session. It had been a matter of general complaint for some time past that lessees could not obtain a renewal of their leases, except during the last year of the term, and the renewal of mineral leases was subject to a fine of not less than £2 10s. per acre. To those companies desiring to raise further capital, these conditions were a great drawback, as there was no certainty as to the terms on which the renewal would be granted; and, moreover, a renewal could not be arranged until the lease was about to expire. Under the new law, the lessees will have ample time to arrange for their renewals. The system of paying a fine has been abolished, and the condition of renewal will now be the payment of a royalty proportionate to the net annual profits of the mine. It will be seen that by these means those lessees who are working their mines at a loss will be able to obtain renewals without expense, while those who are successful would be required to pay a royalty in accordance with the sliding scale fixed by the Act. The Act also makes provision for some minor defects in the present law as regards agreements to mine on private property.

MINERS' ACCIDENT RELIEF AMENDMENT ACT.

An Act to amend the Miners' Accident Relief Act, 1900, was submitted to and passed by Parliament during the year.

The definition of the term "mine" in the original Act is extended to include works in the neighbourhood of the mine where ore, coal, or shale from the mine is treated by the owners.

Provision is made for the constitution of joint committees for two or more mines in or about which there are in the aggregate fifteen or more persons employed.

The remuneration of committees and payment of expenses locally incurred are provided for by an allowance at the rate of 5 per cent. on the moneys contributed by workmen, the maximum allowance to any one committee being £25 per annum and the minimum £2 10s.

The method of computing the amounts payable by owners of mines is altered, and it is prescribed that the contribution of an owner shall be a sum equal to one-half of the aggregate sums deducted from the wages of his workmen.

If it should appear to a committee that the allowance paid in respect of a child is not being properly expended for the child's benefit, the committee may pay such allowance to any other person.

Provision is made for the payment of allowances to the fathers of persons killed by mining accidents, where it is proven to the committee that the fathers were dependent upon the sons for support.

In cases of permanent disablement, a weekly sum of 2s. 6d. is payable in respect of each child of the person so disabled until the child attains the age of 14 years.

CONSOLIDATING AND AMENDING MINING BILL.

A Bill to consolidate the various Mining Acts now in force in the State, and to make necessary amendments in the Mining Laws, was submitted to Parliament during last Session, but, owing to pressure of other legislation, was not debated. It is thought that during the ensuing Session the Bill will be passed into law. It may be mentioned that the present Mining Act, dealing with mining on Crown lands, has been in force since 1874, and it has required amendment from time to time as new conditions in regard to mining presented themselves. The result has been that the Department finds itself hampered with a number of Mining Acts, the procedure under which has become somewhat complicated; and it was with the object of simplifying the procedure, as well as amending the defects in the present law, that the Bill was introduced. It is confidently expected that when it is passed the public will have one comprehensive measure, which will be readily understood and easily worked, and that the many inconsistencies in the present law will be remedied.

MINING ON PRIVATE LANDS ACT AMENDING BILL 1901.

This Bill, having for its object the extension of the present Mining on Private Lands Act, passed the Legislative Assembly last Session but was rejected by the Legislative Council. The principal clause in the Bill was that allowing all minerals to be mined for on private property. At present only gold, silver, lead, tin, and antimony, are subject to the provisions of the Act, and it is thought that now the principle of mining on private property has been conceded there can be no objection to its extension as regards other minerals.

Another effort will be made to pass this Bill into law during the ensuing Session.

THE BILL TO AMEND THE DREDGING ACT.

This Bill was introduced during last Session, but owing to pressure of business it was not debated by Parliament. The object of the Bill was to give greater encouragement to those who take up land for dredging purposes by decreasing the rent and making the conditions more easy. It has been a matter of general complaint in the past that the rent charged by the Crown under the present law, viz., £1 per acre, is excessive, and that the industry is thereby greatly handicapped.

Another attempt will be made during the ensuing Session to pass the Bill, it being considered that every encouragement should be given to those who are prepared to invest capital in an industry having for its object the working of river beds which have not hitherto proved amenable to ordinary mining methods.

MINERS' ACCIDENT RELIEF FUND.

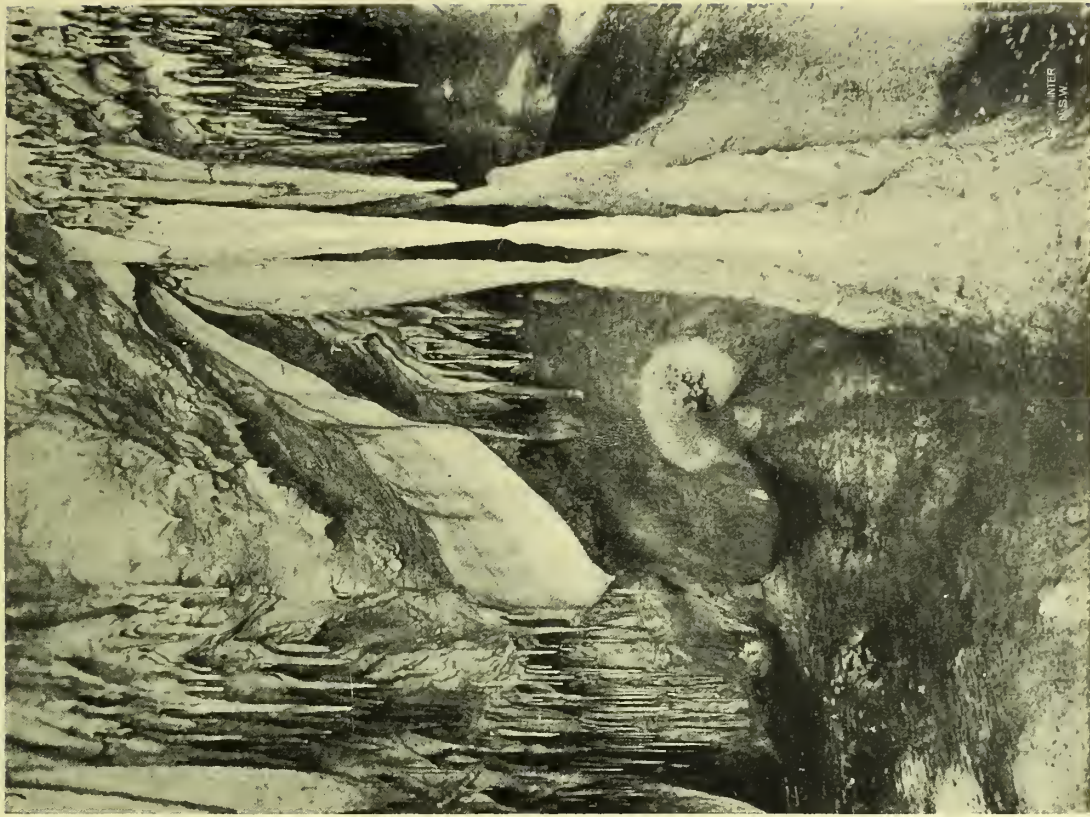
A detailed report by the Miners' Accident Relief Board on the result of the first year's operations will be found in the Appendix to this volume.

The Act, the outlines of which were given in last year's Report, has been well received, and the report shows that the first year's operations have been highly gratifying, the amount to credit at its close being £24,984 1s. 4d. The amount received from the employees totalled £19,118 2s. 8d., representing, approximately, a year's contributions from 20,000 persons; the amount contributed by the owners was £6,304 14s. 1d., and the Government subsidy was £6,140 15s., the total income being £31,906 7s. 7d.

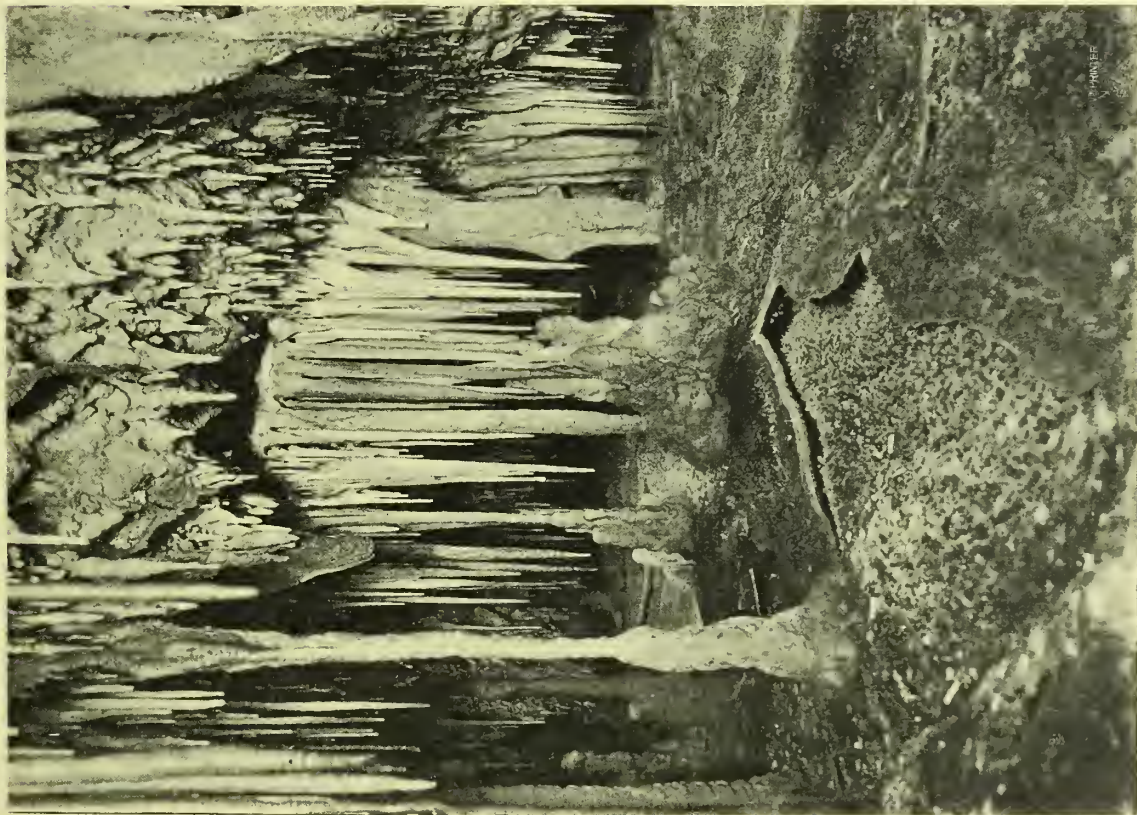
The following statement shows the beneficent operations of the fund:—

Number of distinct mines subject to the Act during the year.....	168
„ mines subject to the Act, December 31st, 1901	123
<i>Fatal Accidents.</i>	
Number of fatal accidents	47
Widows receiving benefits from the fund	26
Mothers	6
Aged sister.....	1
Children in respect of whom benefits are payable	80
Average age of children	7 years
<i>Non-fatal Accidents.</i>	
Number of non-fatal accidents for which allowances were paid	2,558
Periods of disablement:—	
Extending beyond 8 weeks*	210
„ from 4 to 8 weeks	409
„ 2 to 4 „	859
Under 2 weeks	1,080
<i>Relief granted.</i>	
Funeral allowances paid	£ 564 0 0
Total relief paid, exclusive of funeral allowances:—	
(a) To relatives of deceased persons	487 12 9
(b) To persons disabled	5,426 19 8
Total	£ 6,478 12 5
Average amount paid in cases of disablement	2 2 6

* In eighteen cases disablement extended beyond six months, varying in duration from twenty-six to forty-nine weeks; several of these persons are still participating and will probably be permanent beneficiaries.



SHAWL AND PILLARS, MAFEKING CAVE, JENOLAN.



GROTTO IN THE MAFEKING CAVE JENOLAN.

PROSPECTING.

The amount voted by Parliament to promote the prospecting for gold and other minerals was, as formerly, £25,000 for the year.

The total number of cases dealt with by the Prospecting Board during the year was 1,422, as under :—

Aid granted in.....	419 cases
Aid refused in	580 „
Applications for a Public Battery	7 „
Respecting claims for discovery of Gold and Mineral Fields	8 „
Miscellaneous	408 „
	<hr/>
	1,422 cases

The foregoing figures represent the cases disposed of by the Board, but the total number of communications received in connection with the administration of the Vote was 5,449.

The applications for assistance from the Vote were well distributed all over the State, and the Chief Inspector and Inspectors of Mines devoted much time and attention, outside their ordinary duties, in inspecting and reporting on the respective sites.

Many of the grants made during the year have been attended with promising results. A number of discoveries have been made, and several payable mines have been established.

As a result of the efforts of the Board, prospecting at the deeper levels is being carried on much more persistently than formerly, and a considerable impetus is likely to be given to mining in more than one district, owing to the encouragement which has attended operations at a depth.

The Corowa Deep Lead Gold-mining Company advanced its drive, with the assistance given by the Board, right under the deep ground, and was enabled to test the wash overhead by boreholes, the results indicating that the wash is payable. As other deep leads are known to exist in the locality, it may be confidently anticipated that extensive mining operations will be carried on in the future on this field.

The shaft of the Nine Mile Deep Lead Tin-mining Company was bottomed at a depth of 158 ft. 6 in., the existence of a deep stanniferous lead being proved. Although the prospects obtained cannot actually be said to be payable, owing to the shaft having bottomed on slightly high ground, further operations will, doubtless, prove the lead to be remunerative. All previous efforts to bottom a shaft at this place had failed, and the assistance given by the Board in this instance would seem to have been amply justified.

The boring undertaken at the instance of the Board, with the object of prospecting for alluvial gold on the Wyalong Goldfield, was completed in the early part of the year; and although all the most likely sites were given a thorough test, I regret to say the work was without any result.

A series of boreholes were put down with the object of prospecting for an auriferous channel in the deep ground into which the various leads at Home Rule, near Mudgee, had been traced. The operations were successful in locating the deep channel, but the lead at the spot pierced by the bores was deemed unpayable. As, however, it is assumed the ground higher up the lead would most likely prove richer, it has been decided to put down a further number of boreholes.

The attention of the Board was called to an area of land at the head of Kiangra Creek, Narooma, which was unworkable on account of water, even in the driest seasons, and as the reports were favourable, and mining being in a languishing state in the district, the Board recommended that a short drainage race be cut by the Department, and the work has been put in hand.

The Board have been called on to report upon a number of claims for rewards for the discovery of new gold or mineral fields, but in no instance were they satisfied that the conditions of the Reward Notice had been complied with. The conditions are—(1) That the site of the discovery be distant not less than 10 miles from the nearest mine in which similar payable mineral has been or is being obtained; (2) That such discovery be made known within what shall be deemed reasonable time after such discovery; (3) That it be proved to the satisfaction of the Minister that, within six months after he has been notified of such discovery, not fewer than 300 miners have been profitably employed in mining upon such field or deposit.

Several applications for the erection of public batteries were also dealt with by the Board, but in no case did they consider that the expenditure of any public funds would be justified. The principles which the Board emphasise as being essential to warrant the Government in undertaking the erection of a public battery are—(1) An absolute assurance that reasonable facilities do not already exist for the reduction of the ore; (2) An expression of opinion from a qualified officer that sufficient stone is likely to be forthcoming to keep the battery running, so that same would not have to be closed down for the greater part of the year.

GEOLOGICAL SURVEY BRANCH.

This Branch, as in the past, has transacted much useful work during the year under the able supervision of the Government Geologist, Mr. E. F. Pittman.

A considerable proportion of the time of the Survey Staff was, as usual, taken up in inspecting reserved mineral lands and reporting on proposals by the Lands Department to alienate portions thereof. As the area of the public estate reserved for mining purposes is being steadily diminished, it is necessary that all requests for the withdrawal of any part of the existing reserves should be inquired into with the greatest care; for, although provision is made for the mining of gold and other minerals on alienated lands, it is most desirable that the prospector should be hampered as little as possible, seeing that he can ill afford the loss of time and money which the usual procedure entails before he can be placed in possession of private lands.

In addition to the numerous special reports furnished by the Government Geologist and the Geological Surveyors, several interesting and valuable publications were issued during the year, and have been received with the greatest favour by those interested in the mining industry. The work on "The Mineral Resources of New South Wales," by Mr. Pittman, reflects great credit, not alone upon the author, but the Department, and will do much to make known the varied mineral resources of the State.

Mr. Geological-Surveyor Carne was principally engaged during the year in continuing the geological survey and examination of the kerosene shale deposits. The collection of the data for the Memoir on Kerosene Shale by this officer is in course of completion, and will be ready for the printer during the current year.

Mr. Geological-Surveyor Jaquet's Memoir on "The Iron Ore Deposits of New South Wales" was issued about the middle of the year, and this work should have a considerable influence in establishing the iron smelting industry in this State. At the end of the year Mr. Jaquet commenced a geological survey of the Southern Coal-field. This is an important undertaking, and the issue of a Memoir on the extent and quality of our coal resources will be much appreciated by those interested in this branch of the industry.

Mr. Geological-Surveyor Andrews furnished a report, accompanied by a geological map, of the Yalwal gold-field. He also completed a geological map of the country traversed by the Kiandra Deep Lead, and his report was, at the close of the year, in the hands of the Government Printer, and should precede the issue of this volume. There is strong evidence that, as a result of Mr. Andrew's investigations, capital will be forthcoming to develop this field.

Mr. J. C. H. Mingaye, Analyst and Assayer to the Department, and his staff of assistants have, as usual, transacted a large amount of difficult and intricate work during the year, the number of assays, &c., made totalling 4,147.

Mr. Card, Mineralogist and Curator; Mr. W. S. Dun, Palæontologist and Librarian; and Mr. O. Trickett, Surveyor and Officer-in-charge of Limestone Caves,—have ably carried out their duties. Mention must also be made of the good work done by the Field Assistants and other Officers of the Branch.

A detailed report by the Government Geologist on the year's operations will be found in the appendix hereto.

ADMINISTRATION OF THE COAL AND SHALE MINES REGULATION ACT.

The number of coal and oil-shale mines in operation during the year was 100.

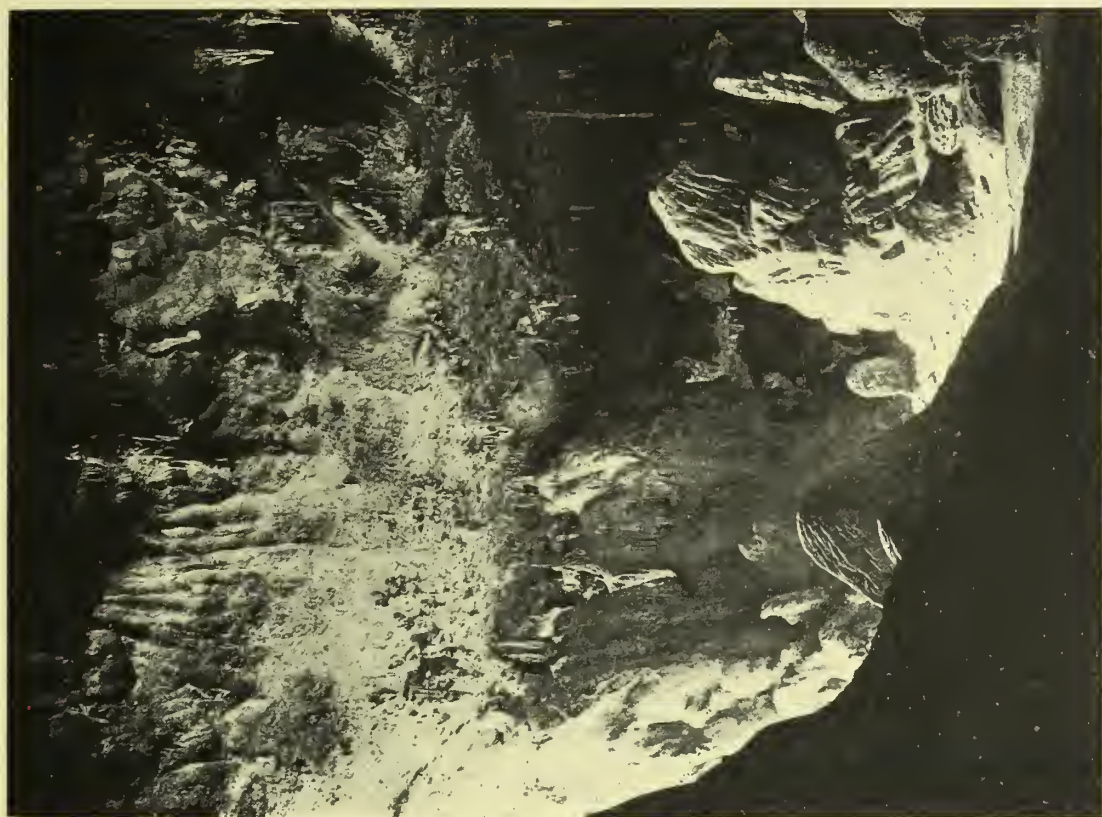
The inspection of these mines was ably carried out by Messrs. Rowan, Bates, Humble, and Dixon, under the guidance of Mr. A. A. Atkinson, the Chief Inspector, who has been unremitting in his attention to the onerous duties which have devolved upon him.

The Greta Mine, in which an unfortunate fire occurred on the 5th December, 1900, resulting in the death of five men, was reopened in the beginning of April; but, in consequence of the difficulties of dealing with the large quantity of heated material, the fire revived, and the shafts were resealed, after having been open for ten days.

An explosion of fire-damp and coal-dust occurred at the Burwood Colliery on the 13th November, resulting in the death of three men. An inquest, lasting ten days, was held, and prosecutions of the colliery officials afterwards followed. It is satisfactory to know that safety lamps have since been introduced into all the working faces of this colliery. A comprehensive report by the Chief Inspector of Coal Mines will be found as an Appendix hereto.



NORTHERN ENTRANCE, ABERCROMBIE CAVES.



PART OF THE HALL OF TERPSICHORE, ABERCROMBIE CAVES.

INSPECTION OF MINES OTHER THAN COAL AND SHALE.

The Chief Inspector, Mr. Slee, and his staff of Inspectors have been kept exceptionally busy during the year in inspecting and examining the metalliferous mines of this State. These Officers have also been called upon, in addition, to report on the large number of applications for assistance from the Prospecting Vote, and it is a tribute to their zeal and enthusiasm that they have been enabled to so satisfactorily cope with the increased volume of work.

The Mines Inspection Act was passed by the Legislature and came into operation in February of the current year. Provision has now been made for the inspection and regulation of metalliferous mines in a somewhat similar way to that of the coal and shale mines; and although this Act will of necessity largely increase the work and responsibilities of the Chief Inspector and those under him, it will invest them with the power they have so long needed, and enable them to bring about a number of desirable improvements in the working of our metalliferous mines.

The vacancy on the staff, consequent on the resignation of Mr. Inspector Hebbard, was filled in May last by the appointment of Mr. R. Schloesser, the successful candidate at the competitive examination held by the Public Service Board.

Mr. Slee during the year visited the following places:—Gundagai, Young, Adelong, Grenfell (these four on two occasions), Clifton and South Coast District, Newcastle District, Broken Hill, Albury Cootamundra, Braidwood District, Orange, Wellington, Cobar, Boppy Mountain, Tomingley, McPhail, Peak Hill, Alectown, Parkes, and Forbes.

The inspection of the mines in the several districts was allotted as follows during the year:—Broken Hill District, Inspectors Milne and Godfrey; Cobar-Nymagee District, Inspector Schloesser; Western District, Inspector Hooke; South Coast District (and including Cooma and Kiandra), Inspector Polkinghorne; District North of Newcastle, Inspector Carthew; Wyalong, Adelong, Gundagai, and Albury Divisions, Inspector Whittell.

A full report on the operations of this Branch will be found in the Appendix hereto.

MINING SURVEYS.

In this branch of the Department the work has been kept closely up to date, and at the end of the year there were only fifty-nine survey instructions undealt with in the hands of surveyors. All these represented applications recently made.

The services of Licensed Surveyors, remunerated by fees only, were utilised in the Inverell, Bega, and Tumut Districts, and elsewhere as opportunity offered.

The number of surface mining surveys made during the year was 642. Of these 514 were made by Surveyors on salary, and 128 by Licensed Surveyors.

The surveys made comprised the following:—

Gold Leases on Crown Land	...	...	...	...	...	329
Leases for Gold Dredging	...	...	...	...	...	21
Gold and Mineral Leases on Private Land	...	...	...	...	...	34
Mineral Leases on Crown Land...	...	...	...	...	...	160
Mining Permits (28th Section)	...	...	...	...	...	37
Mining Tenements	...	...	...	...	...	46

Underground surveys of Wickham and Bullock Island, and Stockton Collieries were made during the year; also a survey to determine the position of the barrier to be preserved between the A. A. Company's and the Newcastle Coal Company's Collieries.

CHARTING BRANCH.

The number of ordinary gold and mineral lease applications dealt with during the year was 940.

206 applications for areas required for gold or mineral dredging were dealt with as far as practicable, pending local inquiry by Mining Wardens. Many of these cases involved much research and lengthy area calculations.

The number of 27th and 28th section applications dealt with was 150.

Ninety-five applications to lease land under the provisions of the Mining on Private Lands Acts were dealt with.

176 plans of measurements under the Mining Board Regulations were examined and charted, and copies forwarded for delivery to applicants and for local record.

At the close of the year there remained under action in the Branch—110 gold and mineral lease applications, 4 dredging lease cases, 13 applications under 28th section, and 11 applications for lease of private land.

During the year 537 applications for authority to enter private land for mining purposes, and 47 agreements relating to mining on private land, were investigated, and the positions of the areas indicated upon maps.

Seventy-nine reserves under the 26th section of the Mining Act of 1874 were described, gazetted, and charted.

In 16 cases action was taken with a view to inducing the Department of Lands to create reserves from alienation in the interests of mining.

In 23 cases alterations were made in the boundaries of Mining Districts and Divisions. Descriptions were prepared for gazettal, and the alterations in all cases were shown upon illustrative maps supplied for the use of local officers.

1,169 notations of transactions relating to leases, &c., were made upon plans during the year.

778 plans of ordinary mining surveys were drawn; also plans of Hetton, and Wickham and Bullock Island Collieries.

To facilitate the work of the Chief Inspector of Collieries, the identification of colliery holdings and charting them upon maps has been continued. A set of maps is maintained with the object of showing distinctively the lands under which the Crown may claim royalty on coal extracted, and the lands where the Crown has not this right. In certain instances later workings have been charted on colliery plans, and tracings, maps, and plans prepared for the Chief Inspector.

Thirty-four maps of parishes, &c., were prepared, charted to date, and placed in use in the Branch for charting leases and authorities under the Mining on Private Lands Acts.

119 proofs of Lands Department maps were revised, and 118 draft references prepared with regard to mining surveys before publication of the maps by the Department of Lands. In many instances special mining references were placed upon maps in current use.

Eighty-three maps of mining localities were prepared with a view to heliographic reproduction.

227 standard maps were charted up during the year. The Department now possesses 2,511 of these maps. Two mining district maps were revised, and new editions printed.

513 charted-up copies of maps were forwarded to Mining Wardens, Registrars, and others.

Three cases of resumption of parts of the surface of leases required for public purposes were dealt with.

268 illustrations, comprising charted-up maps, tracings, &c., were prepared for the use of officers of the Stock Branch.

In addition to lease applications, survey reports, and other unregistered documents, 6,500 papers were received and dealt with during the year.

All the tracings required by surveyors employed by the Department were supplied by the Branch.

In consequence of the decease of Queen Victoria it became necessary to replace all diagram forms bearing her name with others with the King's name. This involved the redrawing of hundreds of diagrams representing the cases undealt with at the time of the Queen's death.

4,363 heliographs of mining maps and plans were printed. A number of these were sold to the public.

3,967 plans, maps, &c., were mounted, and 34 books bound by the Plan Mounter.

At the close of the year, in all departments of the work of the Branch, both in field and office, there were no arrears.

I have much pleasure in placing on record the highly-efficient and prompt manner in which the business of this Branch has been conducted during the year. The Chief Mining Surveyor, since he has had charge, has constantly been effecting improvements in the method of carrying out the work, with the result that his Branch is one of the most satisfactory connected with the Department. The work is often of the most difficult and intricate kind, and the head of the Branch and all those associated with him are to be commended for the zeal, promptitude, and efficiency with which they have carried out the share of the business of the Department entrusted to them.

COUNTRY OFFICERS.

I desire to acknowledge my indebtedness to the Wardens, Mining Registrars, and Bailiffs, for the information furnished by them for inclusion in this Report. I also have to express my appreciation of the generally efficient and satisfactory manner in which they have transacted their portion of the business of the Department. It is only by their loyal co-operation and an intelligent interest in their work that the operations of a Public Department can be satisfactorily carried on ; my demands upon the Officers in the country have been readily responded to, and in this way I have been helped in no small degree to carry on the numerous and expanding duties of my position.

HEAD OFFICE STAFF.

It is my pleasing duty to testify to the zeal with which all the Officers have carried out their duties. Owing to their diligence the work has been kept up to date, and the efficiency attained by the Staff is a matter for congratulation. To the Chief Clerk and Heads of Branches, I have to express my obligations for the support and assistance so willingly extended to me during the year.

I have the honor to be,

Sir,

Your most obedient servant,



Under Secretary for Mines and Agriculture.

Department of Mines and Agriculture,
Sydney, 15th March, 1902.

ANNUAL REPORT OF THE CHIEF INSPECTOR OF METALLIFEROUS MINES AND SUPERINTENDENT OF DIAMOND DRILLS.

(MR. W. H. J. SLEE, F.G.S.)

Sir,

In submitting my annual Report for the year 1901, I again do myself the honor to acknowledge with thanks the assistance given me by the Wardens, Coroners, Inspectors of Mines, Wardens' Clerks, and Mining Registrars, in furnishing me with the earliest possible notification of any accident occurring in connection with the metalliferous mines in their respective districts.

The Mines Inspection Act which was passed during the latter part of the year, but which does not come into force until 1st February, 1902, has many features hitherto unknown to the mining community of New South Wales, and which it is sincerely hoped will prove beneficial to all concerned. Until at least a few months trial has been given to the practical working of the Act, nothing much can be said at present of its real effects on the industry.

In addition to attending to my continually increasing office work, the following-mentioned localities were officially visited by me during the year:—Clifton, Newcastle, Gundagai, Adelong, Harden, Young, Grenfell, Cootamundra, Albury, Broken Hill, Braidwood, Wellington, Cobar, Mount Boppy, Dubbo, Tomingley, McPhail, Peak Hill, Alectown, Parkes, Forbes, Molong and Orange; most of these places were visited twice, and some three times.

The number of persons assisted to our goldfields with free railway fares, presumably to go fossicking for gold, was 87, as against 267 in 1900. As, however, very little, if any, favourable results were obtained, I recommended, in October last, that the system be discontinued, and my recommendation received the approval of the Honourable the Minister, hence free railway passes will not in future be issued by this Department unless in very exceptional cases.

Diamond-drill boring operations were carried on during the year at Otford (South Coast), Reno (Gundagai), and Walsh's Island (Newcastle). At Otford and Walsh's Island, the boring was done in the coal measures, while that at Reno was in porphyry with the object of prospecting for an auriferous quartz reef below the vertical depth of 1,200 ft. from surface. Sections of the bores, compiled from the foreman's weekly reports are herewith.

It is with real pleasure that I acknowledge the great assistance so willingly given me during the year by all Officers, both inspecting and clerical, connected with my branch.

I submit, herewith, Tables marked from A to H, dealing with various subjects in connection with the inspection of metalliferous mines:—

TABLE A—Showing fatal and serious accidents during the year which may be considered as true mining accidents.

TABLE B—Showing fatal and serious accidents during the year which mostly occurred on the surface and cannot be considered as true mining accidents.

TABLE C—Summary of Tables A and B, giving the total number of fatal and serious accidents from all causes both above and below surface, of the metalliferous mines of New South Wales, which occurred during the year 1901. The fatal accidents number 38, or 4 less than in 1900, and the serious accidents 74, or 16 less than in 1900.

TABLE D—Showing number of men employed in and about the metalliferous mines of this State, and value of machinery at the end of the year 1901, also the percentage of fatal and serious accidents per 1,000 men employed.

TABLE E—Diagram illustrating the death rate per 1,000 persons employed for the years 1891 to 1901.

TABLE F—Comparison of accidents recorded during the years 1896, 1897, 1898, 1899, 1900, and 1901.

TABLE G—Return under the Lead Poisoning Act since that Act came into force in 1895 to the end of 1901.

TABLE H—Return of Dredging Accidents.

It will be observed that I have omitted from this report several of the Tables dealing with mining accidents which were published in former Annual Reports, but which related solely to the Broken Hill Mines, and were a repetition in mere detail of the information given in Tables A and B; these certainly appear to me to be unnecessary, causing extra printing and clerical work without any beneficial results.

I have also omitted in this Report the publication of all minor and trivial accidents, only giving the fatal and serious ones; as, since the Miners' Accident Relief Act has been in force, the minor and trifling accidents reported have become more numerous, and some of these are of so very trivial a nature that they are hardly worth noting. Nevertheless, although I think it superfluous to publish these accidents in this Report, every accident, however trifling (and a large majority are of the latter class) is noted and filed in the records of my branch for future reference, should such be required, quite independently of what is done by the Secretary of the Miners' Accident Relief Board.

The number of persons employed in the metalliferous mines of New South Wales during the year 1901 was 24,200, or 8,054 less than during the year 1900. This large but temporary decrease is principally caused through the long and severe drought which predominated all over the State, and the low price of metals. The latter cause has greatly affected our copper, silver, zinc, and other mining operations; and in the Broken Hill and Cobar districts, alone, several thousands of persons lost their profitable employment. This is a sad state of affairs, but, although a severe check has been given to the development of our mining industry, it cannot be considered otherwise than temporary, because should the drought break up, a large number of persons will again be required at the mines which have been closed down for want of water. As to the prospects of an immediate increase in the market value of metals, few, if any, are able at the present juncture to give a reliable opinion.

At Broken Hill progressive and development work is going on with the usual vigour; the proving of the value of the ore at a lower depth, the improvement of machinery, the methods adopted to save a greater percentage than hitherto of marketable minerals, and also the reduction in the cost of producing the metals, are all receiving most careful attention.

Very

Very interesting statistics of the Broken Hill field are given by the Inspectors of Mines, Messrs. Milne and Godfrey, and of the Cobar district by Mr. Inspector Schloesser.

These two districts are the most affected by the low market value of metals as well as by the drought. Several of the gold mines in the Cobar district were obliged to discharge their miners and close down on account of the failure of the water supply. This, it is to be hoped, will teach the necessity of enlarging the storage capacity of the tanks, which are comparatively very insignificant when the large bodies of ore in the mines are taken into consideration, more especially as this is not the first occasion that most, if not all, the dividend-paying mines of Cobar have been in a similar predicament. Any one who has been in Cobar when rain is falling, feels rather surprised at the large volume of water which is allowed to run to waste in all directions, instead of being conserved in extensive and deep tanks. Shallow tanks are of little use in such a climate, where the evaporation is naturally very great. I may here be allowed to reiterate the opinion expressed by me in my Annual Report of 1876, just twenty-five years ago, to the effect, that when a mine is paying its way, sinking and cross-cutting—and I may here add all progressive works, including provision for the storage of water—should be forced ahead. Frequently, however, instead of following this course, the bunch, run, or patch of gold or other mineral, is worked out, and very little, if any, progressive work is undertaken. Dividends may be paid, but very little capital is laid by for expenditure on the work of future development; consequently, as soon as the mineral-producing powers of a mine diminish, development is stopped; or perhaps a small call per share is made, after which the mine is often condemned as worthless, and no further effort is made to prove its value at a deeper level. This suicidal practice discourages the mine manager, gives him no justice, and affords him no opportunity of bringing his ability and his practical and scientific knowledge to bear on the development of the mine under his charge.

I have, &c.,

W. H. J. SLEE,

Chief Inspector of Mines.

The Under Secretary, Department of Mines and Agriculture.

TABLE A.

Showing Fatal and Serious Accidents during year ending 31st December, 1901, which may be regarded as True Mining Accidents.

No.	Date of Accident.	Name of Mine.	Locality.	Number of persons in each Accident.	Names of Persons Killed or Injured.		Mining for—	Occupation.	On or under Surface.	Nature and Cause of Injury or Death.	If by Explosion, kind of Explosive used.
					Killed.	Serious Injuries.					
1	1901. 3 Jan.	Central	Broken Hill..	1	.....	Frederick Thomas..	Silver and lead.	Miner ..	Under	Leg fractured; fall of rock.	
2	8 "	Junction	" ..	1	.....	James Rodgers	" ..	" ..	" ..	Back injured; fall of rock.	
3	11 "	B. H. Proprietary ..	" ..	1	.....	Frederick Jacques..	" ..	Trucker..	" ..	Fingers crushed; jammed with truck.	
4	11 "	Block 10	" ..	1	.....	Thomas H. Hunt ..	" ..	Miner ..	" ..	Hip and ribs injured; ladder fell.	
5	21 "	Gilgai	Inverell	1	Edward S. Percy ..	" ..	Tin	" ..	" ..	Foul air.	
6	24 "	B. H. South	Broken Hill..	1	.....	Richard Collins....	Silver and lead.	Trucker ..	" ..	Foot bruised; fall of stone.	
7	31 "	Royal George....	Cullenbone ..	1	Albert Davis	" ..	Gold	Miner ..	" ..	Foul air.	
8	1 Feb.	Shamrock-cum Waratah.	Wyalong	1	.....	John Tremayne....	" ..	" ..	" ..	Leg broken; fall of stone.	
9	5 "	B. H. Proprietary ..	Broken Hill..	1	.....	Alex. McDonald....	Silver and lead.	" ..	" ..	Ribs fractured; fell down shoot.	
10	7 "	Alluvial	Upper Temora	1	John Price	" ..	Gold	" ..	" ..	Fall of earth.	
11	8 "	British	Broken Hill..	1	Thomas G. Carter..	" ..	Silver and lead.	Trucker..	" ..	Fall of rock.	
12	15 "	B. H. Proprietary ..	" ..	1	.....	Richard Grant	" ..	Miner ..	" ..	Head cut; fall of rock.	
13	16 "	British	" ..	1	.....	Charles Whetstone..	" ..	" ..	" ..	Leg broken; fall of rock.	
14	23 "	B. H. Proprietary ..	" ..	1	.....	William Kelly	" ..	" ..	" ..	Eye cut; struck by stone.	
15	15 Mar.	Bombo Gold	Bombo	1	.....	Thomas Thompson	Gold	" ..	" ..	Various injuries; fall of rock.	
16	19 "	B. H. Proprietary ..	Broken Hill..	1	George Vivian Lowe	" ..	Silver and lead.	" ..	" ..	Skull fractured; sudden fall of bucket.	
17	19 "	Gt. Cobar Copper	Cobar	1	.....	A. Marconi	Copper ..	Labourer	" ..	Finger crushed and amputated; fall of ore.	
18	26 "	B. H. Proprietary ..	Broken Hill..	1	.....	Richard Hobby	Silver and lead.	Trucker..	" ..	Hand injured; struck by piece of rock from shoot.	
19	27 "	" ..	" ..	1	.....	Fred. S. Page	" ..	" ..	" ..	Leg injured; truck upset.	
20	28 "	" ..	" ..	1	.....	Patrick Howard	" ..	Miner ..	" ..	Various injuries; fall of ore.	
21	12 Apl.	" ..	" ..	1	.....	William McDonald..	" ..	" ..	" ..	Cut and bruises; fall of ore.	
22	15 "	Block 10	" ..	1	.....	W. N. Mitchell	" ..	" ..	" ..	Leg fractured; fall of ground.	
23	15 "	B. H. Proprietary ..	" ..	1	.....	Michael Ryan	" ..	" ..	" ..	Knee injured; fall of ground.	
24	19 "	Block 14	" ..	1	.....	W. Simpson	" ..	" ..	" ..	Eye-ball cut by piece of steel.	
25	23 "	Block 10	" ..	1	.....	S. Lawrence	" ..	Trucker..	" ..	Arm broken; struck by truck.	
26	6 May	B. H. Proprietary ..	" ..	1	Ernest Willoughby Chorley.	" ..	" ..	Miner ..	" ..	Smothered; fall of ground.	
27	6 "	" ..	" ..	1	.....	John Stevenson....	" ..	" ..	" ..	Toes crushed; fall of stone.	
28	8 "	B. H. North	" ..	1	.....	Gilbert Reynold ..	" ..	" ..	" ..	Neck and shoulder cut; struck by explosion.	Gelignite.
29	10 "	Central	" ..	1	.....	J. J. Branson	" ..	" ..	" ..	Contusion and cuts from explosion.	"
30	18 "	British	" ..	1	.....	Sam. P. Williams ..	" ..	" ..	" ..	Abrasions, cuts, &c; boring in old socket.	"
31	20 "	Prince of Wales..	Reno	1	.....	Patrick Walsh	Gold	" ..	" ..	Leg broken; fell down winze.	
32	24 "	B. H. South	Broken Hill..	6	John Edwards ....	.....	Silver and lead.	Miners ..	"	Fall of earth.	
33					William Bennetta ..						
34					Samuel Havelock ..						
35					Edward Mason						
36					Harry Down						
37	27 "	B. H. Proprietary ..	" ..	1	John Prideaux ....	.....	"	Miner ..	"	Fell into pass.	
38					Alfred Ernest Campbell.						
39	29 "	Black Prince	Nana Creek..	1	.....	Peter McGinley	Gold	" ..	" ..	Collar-bone broken; fall of ground through heavy rains.	
40	29 "	B. H. Proprietary ..	Broken Hill..	1	.....	Edward Pfitzner ..	" ..	" ..	" ..	Leg injured; fell on an empty truck.	

TABLE A—continued.

No.	Date of Accident.	Name of Mine.	Locality.	Number of persons in each Accident.	Names of Persons Killed or Injured.		Mining for—	Occupation.	On or under Surface.	Nature and Cause of Injury or Death.	If by Explosion, kind of Explosive used.
					Killed.	Serious Injuries.					
41	1911.										
42	30 May	Native Dog Creek	nr. Essington	2	Richard Paton	Thomas Collingwood	Gold	Miners	Under	Suffocated; fall of earth.	
43	30 "	Central	Broken Hill	1		John R. Smith	Silver and lead.	Trucker.	"	Injuries to body; Strained; slipped whilst lifting a loaded truck.	
44	8 June	B. H. Proprietary	"	1	David Curnow		"	Miner	"	Fell down a pass.	
45	8 "	Central	"	1		William Hughes	"	Trucker.	"	Arm fractured; jammed by a loaded truck.	
46	25 "	Prince of Wales	Reno	1		Walter Gittoes	Gold	Miner	"	Eye cut by splinter, hammering quartz.	
47	8 July	B. H. Proprietary	Broken Hill	1		Walter Postyn	Silver and lead.	"	"	Crushed by loaded trucks in attempting to pass on wrong side.	
48	10 "	Lloyd's Copper	Burrage	1	Joseph Ketterer		Copper	"	"	Explosion whilst ramming a charge.	Gelignite.
49	31 "	B. H. Proprietary	Broken Hill	1		Henry Saxby	Silver and lead.	"	"	Leg broken; fell off bulkhead in taking down a machine drill.	
50						John Pozzi				Head and hands bruised; fall of ore.	
51	13 Aug.	"	"	3		Charles Cluskey	"	Timberman.	"	Body bruised; fall of ore.	
52						John Harvey Thomas		Miner	"	Head crushed; "	
53	15 "	Alluvial Claim	Daylight Ck. Sunny Corner.	1	Patrick Kelly		Gold	"	"	Fall of earth.	
54	16 "	Neeld and Sons	Wyalong	1	Fredk. Ernest Parry		"	"	"	Jugular vein cut by stone from blast when standing 130 feet distant from seat of explosion.	Gelignite
55	16 "	B. H. Proprietary	Broken Hill	1		Louis Banfield	Silver and lead.	"	"	Leg broken in two places; fall of ground.	
56	19 "	Gulf Creek Copper	nr. Barraba	3		Fredk. Geo. Tempest		Copper	Miners	Overtaken by fire; severe burns.	
57						Seymour Johns					
58	23 "	Mt. Parnassus	Gundagai	1		Geo. H. Dyson					
59						Wm. Joseph Lynch	Gold	Miner	"	Compound fracture of leg; explosion.	Dynamite.
60	26 "	Kimberley	Cataract Riv'r nr. Drake.	1		James Lawler	"	"	"	Ankle dislocated, and injuries to body; when ascending fell out of rope.	
61	27 "	Central	Broken Hill	1		Joseph Lyons	Silver and lead.	"	"	Ankle injured; rock rolled, dislodging a piece of timber, which struck his ankle.	
62						Thomas J. Burt		Trucker	"	Arms and legs crushed; fall of timber.	
63	3 Sep.	Conrad S. and L. Mine.	Bora Creek	2		John Dunn	"	Miner	"	Body crushed and arm lacerated; fall of timber.	
64	3 "	B. H. Proprietary	Broken Hill	1		P. Walsh	Silver and lead.	Trucker.	"	Jaw fractured; hard knocked out of his hand striking his face.	
65	6 "	La Carabine	Forest Reefs.	1	William John Rowe		Gold	Miner	"	Broken spine, &c.; fall of ground.	
66	12 "	B. H. Proprietary	Broken Hill	1		William Burchett	Silver and lead.	"	"	Leg fractured; fall of ground.	
67	26 "	"	"	1		Sydney Campbell	"	Trucker.	"	Internal injuries; jammed by a loaded truck.	
68	1 Oct.	"	"	1		Joseph Coles	"	Miner	"	Arm and wrist injured; fell and struck by falling timber.	
69	1 "	Central	"	1		Henry Spragg	"	"	"	Contused wound on back of head; fall of stone.	
70	8 "	Eureka	Mt. McDonald	1	George Stokes		Gold	"	"	Skull crushed; fall of ground.	
71	10 "	Golden Gate	Upp'r Temora	1	Charles Ernest Doney.		"	"	"	Cask, used for hauling purposes, fell down shaft, striking deceased on back of head.	
72	17 "	Central	Broken Hill	1		Thomas Keuny	Silver and lead.	"	"	Leg fractured; fall of rock.	
73	24 "	Gt. Cobar Copper	Cobar	1	Alexander Posford Ginger.		Copper	Mullockeer	"	Crushed; fall of earth.	
74	25 "	B. H. Proprietary	Broken Hill	1		John Rogers	Silver and lead.	Trucker.	"	Skull injured; fall of ore.	
75	26 "	Occidental Gold	Wrightville	1		Hugh J. Oliver	Gold	Carpenter	"	Body bruised; fall of stones.	
76	13 Nov.	B. H. Proprietary	Broken Hill	1	John Campbell		Silver and lead.	Miner	"	Crushed; fall of stone.	
77	18 "	La Carabine	Forest Reefs.	1	William Joseph Kelly.		Gold	Mine manager.	"	Rope broke when hauling deceased to top; fell a distance of 200 feet.	
78	22 "	Occidental	Wrightville	1	Patrick Carey		"	Miner	"	Explosion; body fell into a cutting 80 feet deep.	Blasting powder.
79	18 Dec.	Bimbinbi Proprietary Gold.	Mogo	1		William Pender	"	"	"	Chest, face, and eyes seriously injured; charged five holes, heard four shots, thinking fifth had misfired he returned to ascertain, when the explosion occurred.	Blasting gelatine.
80	18 "	King Conrad	Howell	1		John Daly	Silver and lead.	"	"	Slight fracture of skull and internal injuries; when ascending a shaft fell out of bucket a distance of 40 feet.	
81	24 "	King Conrad	"	1	Donald Duff		"	"	"	Skull fractured; stone falling down shaft.	

SUMMARY OF TABLE A.

	Fatal.	Serious.	Total.
Gold, quartz	5	11	16
Gold, alluvial	4		4
Silver and lead	14	39	53
Copper	3	4	7
Tin	1		1
Total	27	54	81

TABLE B.

SHOWING Fatal and Serious Accidents on surface during year ending 31st December, 1901, as distinguished from True Mining Accidents.

No.	Date of Accident.	Name of Mine.	Locality.	Number of persons involved in each Accident.	Names of Persons Killed or Seriously Injured.		Mining for—	Occupation.	Cause of Injury or Death.	If by Explosion kind of Explosive used.
					Killed.	Serious Injuries.				
1	1901.									
14	Jan.	B. H. South	Broken Hill.	2	William Gehrke		Silver	Quarryman	Killed by a falling skip.	
2	14	"	"	1	John Fahcy		"	"	"	
3	19	"	"	1		Albert A. Martin	"	Machinist	Caught in machinery.	
4	23	"	"	1		Wm. S. Madigan	"	Mill hand	"	
5	27	B. H. Proprietary	"	1		Chas. Norton	"	Carpenter	Fell from roof.	
6	7 Feb.	"	"	1		Daniel Sullivan	"	Quarryman	Fall of stone.	
7	12	Block 14	"	1	George Lamming		"	Trucker	Suffocated.	
8	12	British	"	1		Francis Brockhill	"	Mill hand	Caught in machinery.	
9	26	B. H. Proprietary	"	1	A. F. L. Geyer		"	Labourer	Run over by truck.	
10	3 Mar.	"	"	1		M. Trethaway	"	"	Fall of truck.	
11	5	"	"	1		A. Rundie	"	Quarryman	Fell down open cut.	
12	7	B. H. North	"	1	John Elk		"	Carpenter	Fall of scaffolding.	
13	25	Great Cobar Mine	Cobar	1		J. Lowe	Copper	Riveter	Cut by flying splinter.	
14	16 Apl.	Central	Broken Hill.	1		G. Crawford	Silver	Carpenter	Fell.	
15	17	B. H. Proprietary	"	1		T. Leddy	"	Quarryman	Jammed by truck.	
16	30	"	"	1		J. T. Smith	"	Labourer	Burnt by molten ore.	
17	15 May	Central	"	1		R. Watson	"	Trucker	Injured by truck.	
18	16	B. H. Proprietary	"	1		Wm. Slee	"	Mill hand	Caught in machinery.	
19	25	Conrad	Bora Creek	1		A. Hannon	"	"	"	
20	5 June	Block 10	Broken Hill.	1	F. Scwell		"	Labourer	"	
21	14	Fort Bourke	Cobar	1	F. Lowe		Gold	Mill hand	"	
22	29 July	B. H. Proprietary	Broken Hill.	1	W. E. Dunderdale		Silver	Labourer	Fell into open cut.	
23	24 Aug.	Great Cobar	Cobar	1		J. Short	Copper	Furnace man	Burnt by molten metal.	
24	25	B. H. Proprietary	Broken Hill.	1	Alex. Anderson		Silver	Fitter	Caught in machinery.	
25	28	Cobar Gold	Cobar	1		R. Emerson	Gold	Trucker	Injured by truck.	
26	9 Oct.	Strickland's Mine	Mitchell	1		J. Strickland	"	Miner	Fall of earth.	
27	9 Nov.	B. H. Proprietary	Broken Hill.	1		S. Tillbrook	Silver	Carpenter	Fell.	
28	13	Block 14	"	1	T. A. Stokes		"	Platclayer	Suffocated.	
29	11 Dec.	Great Cobar	Cobar	1	T. Mitchell		Copper	Miner	Premature explosion	Gelignite.
30	14	"	"	1		R. Ohong	"	Furnaceman	Burnt by molten slag.	
31	16	B. H. Proprietary	Broken Hill.	1		W. Adams	Silver	Engineer	Struck by a cage.	

TABLE C.

SUMMARY OF TABLES A AND B.

Class of Mine.	Under or on surface.	Fatal.	Serious.	Total.
Gold, quartz	Under	4	9	13
"	On	1	1	2
" alluvial	Under	6	1	7
"	On	1	1	1
Silver, lead, &c.	Under	14	40	54
"	On	9	15	24
Copper	Under	2	4	6
"	On	1	3	4
Tin	Under	1	...	1
"	On .....	...	...	...
		38	74	112

TABLE D.

NUMBER of Men at work and value of Machinery in and about the Metalliferous Mines in New South Wales, at 31st December, 1901; also the ratio killed and seriously injured per 1,000 employed.

Mining Districts.	Gold.			Silver, Lead, and Zinc.	Copper.	Tin.		Other.	Total.	Machinery.
	Alluvial.		Quartz.			Euro- pean.	Chinese.			
	Euro- pean.	Chinese.								
Albert	75	3	18	5,610	330	26	.....	927	6,989	£ 647,275
Bathurst	936	54	1,084	20	1,030	.....	.....	57	3,181	225,009
Clarence and Richmond	67	2	99	6	8	.....	.....	.....	182	9,160
Cobar .....	.....	.....	644	48	1,193	.....	.....	.....	1,885	294,545
Hunter and Macleay	5	.....	99	4	.....	6	.....	29	143	9,545
Lachlan	445	.....	1,660	.....	86	8	.....	68	2,267	151,133
Mudgee	838	54	868	12	60	.....	.....	57	1,889	71,822
New England	100	12	62	56	59	384	190	18	881	45,981
Peel and Uralla	457	76	680	422	182	547	266	172	2,802	216,092
Southern	773	114	671	120	2	.....	.....	118	1,798	215,817
Tambaroora and Turon	607	104	209	.....	.....	.....	.....	.....	920	94,635
Tumut and Adelong	633	54	561	.....	14	1	.....	.....	1,263	125,762
	4,936	473	6,655	6,298	2,964	972	456	1,446	24,200	2,106,776
Persons killed per 1,000 employed	1.109		.751	3.652	1.012	.700		.....	1.570	
Persons seriously injured per 1,000 employed .....	.370		1.503	8.733	2.362	.....		.....	3.058	

TABLE F.

A comparison of Accidents recorded from the year 1893 to end of 1901.

Year.	Fatal.	Serious.	Minor.	Total
1896	35	36	52	123
1897	35	41	36	112
1898	35	27	85	147
1899	39	57	96	192
1900	42	90	109	241
1901	38	74	... ..	.....

Divided into—Under Surface Accidents.

1896	36	26	31	89
1897	29	30	26	85
1898	31	19	69	119
1899	37	45	71	153
1900	33	68	87	188
1901	27	54	.....	.....

And into—Surface Accidents.

1896	3	10	21	34
1897	6	11	10	27
1898	4	8	16	28
1899	2	12	25	39
1900	9	22	22	53
1901	11	20	.....	.....

TABLE G.

LEAD-POISONING Returns in connection with the Lead-poisoning Act of 1895.

Mine.	1895.	1896.	1897.	1898.	1899.	1900.	1901.	Total.
Broken Hill South	15	12	4	5	4	.....	3	43
Sulphide Corporation	40	2	.. ..	6	.....	.....	3	51
Block 10	1	1	.....	.....	.....	.....	.....	2
Broken Hill Proprietary Co. (Limited)	29	21	12	3	8	2	6	81
Block 14	4	1	.....	.....	.....	.....	1	6
British Broken Hill Proprietary .....	.....	3	.....	.....	1	2	.....	6
Broken Hill Junction Silver Mining Co. ....	.....	.....	.....	.....	.....	.....	.....	.....
Broken Hill Junction, North .....	.....	.....	.....	.....	.....	1	.....	1
North Broken Hill Silver Mining Co. ....	.....	4	1	.....	.....	.....	.....	5
New Australian Broken Hill Consols .....	.....	.....	.....	.....	.....	.....	.....	.....
Total.....	89	44	17	14	13	5	13	195
Total number of men employed.....	4,297	5,400	6,473	6,842	7,252	7,405	6,989	.....
Not under any particular Mine.								
Australian Metal Company .....	.....	.....	.....	.....	69	58	.....	127

TABLE H.

DREDGE ACCIDENTS during year ending 31st December, 1901.

No.	Date of Accident.	Name of Dredge.	Locality.	Number in Accident.	Name of Person Seriously Injured.	Mining for—	Occupation.	Cause of Injury.
1	Oct. 2	Araluen Central.	Araluen..	1	John Beadman	Gold	Engine Driver..	Fell from scaffold,

Death Rates from Accidents in and about Metalliferous Mines from 1890 to 1901

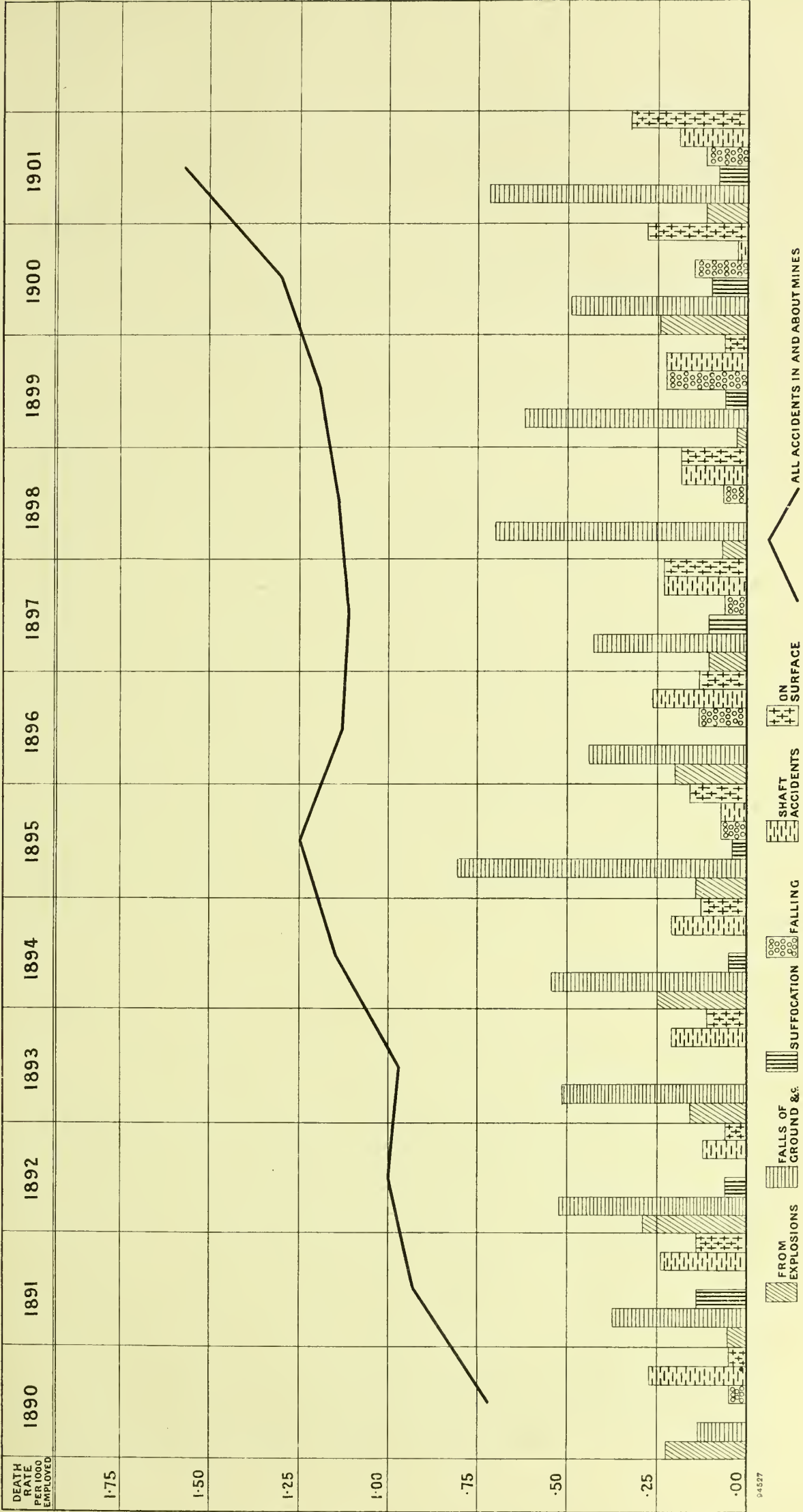


Photo-lithographed by
W. A. Gullick, Government Printer,
Sydney, N.S.W.

Report on the Lachlan Gold-fields Mines.

Sir,

Forbes, 13 November, 1901.

I do myself the honor to inform you that after completion of my inspection of the Cobar, Boppy Mountain, Peak Hill, and Parkes district, and before returning to Sydney I inspected the Lachlan Gold-fields Company's and adjoining mines, situated on the Bald Hills, about 3 miles northerly of Forbes, of which the Lachlan Gold-mine, under the able management of Mr. Alfred John Dunstan, is so far the principal. The greatest depth of this mine at the time of my inspection was 300 feet, and on this level the lode material is quartz associated with a large percentage of iron. The upper part of the lode consisted of oxidized ores, honey-combed and friable; the country rock on the east wall consists of diorite and on the west wall of slate, a very good indication as to its permanency both in length and depth.

The lode has been opened on the 300-foot level for 200 feet in length, with a width of from 10 to 40 feet. The company is a British one. As usual in such cases very little, if any, information can be given by the mine-manager, however willing he might be, as to the exact yield of gold, but what little I could glean indicated that the yield has not so far been extra good, but from present appearances a better yield is anticipated, and the indications are so very promising that in the near future higher returns should be obtained for the capital invested.

About sixty-five men are employed on this mine. A ten-stamp battery is crushing night and day, and two other batteries of five stamps, each, are in course of erection, so that in a short time twenty stamps will be ready for crushing purposes. Machinery for collecting concentrates, and the treatment of same, also the slimes, is in full swing. Mr. Dunstan is a metallurgist and has had several years of practical mining experience; hence, he is always on the alert for the improvement of his gold saving appliances.

The machinery and everything else connected with the mine is in good order and condition, and a great credit to the management.

There were other mines doing prospecting and progressive work, northerly of and adjoining the boundary of the Lachlan Gold-fields (Limited), of which those held by Messrs. Nicolls and party and Messrs. John O'Shannessy and party are the principal. The lode in the latter party's mine, as well as in the adjoining mine, has been opened by numerous shafts and drives for a great length, and appears to be the continuation of the same lode which is being developed in the Lachlan gold-mine. As already stated above the latter mine has been proven, to the 310-foot level, to be of a very promising and permanent nature; hence it is but reasonable to assume that these mines, north of the Lachlan gold-mine will meet with the same success. So far the workings have barely reached the depth of 50 feet, nevertheless at that depth the lode is very similar to what is known as the "Big" or Lachlan Gold-fields Mine.

I might here mention that the Bald Hills were formerly worked for alluvial auriferous deposits, some of which yielded highly payable returns; the alluvial sinking generally varied from about 40 to over 150 feet in depth; hence it will be seen that a great thickness of alluvial deposits overlapped the lode, which causes extra trouble and expense in discovering it. In O'Shannessy's mine a vertical shaft to the depth of 127 feet was sunk, the first 40 feet through alluvial. At 70 feet from surface the lode was struck in the shaft, dipping westerly, and at the 87-foot level it was opened by drives and crosscuts. Water is met with at the 90-foot level, which is recognised as the permanent water-level, and here the necessity appears for the erection of pumping gear to contend against the heavy underground flow.

These mines appear to me to have been sufficiently developed to warrant the capital being provided for the crushing, gold-saving, and pumping machinery required; and with systematic and economic management they ought to yield a very good return for the outlay invested. One thing which appears almost a certainty is that this lode by its denudation was the source from which the Bald Hills alluvial lead received its auriferous deposits; this is plainly seen by following the Lachlan Gold-fields lode in a northerly direction, which brings one just ahead of the last payable auriferous alluvial deposits.

The whole of the prospects in the locality, above referred to, are such that if only proper and suitable machinery is erected a new era will be the consequence in the gold-mining industry of the Forbes district.

I have, &c.,

W. H. J. SLEE, F.G.S.,

Chief Inspector of Mines.

The Under Secretary for Mines and Agriculture.

Messrs. Inspectors Milne and Godfrey's Joint Report.

Sir,

Broken Hill, 2 January, 1902.

We have the honor to submit our Annual Report for the year 1901.

A systematic routine inspection of the mines, both above and below ground, has been continually maintained. In addition, an unusually large number of applications for aid from the Prospecting Vote have been dealt with, due to the shortening of hands on the Union line of lode, which caused many of the men to go out and prospect the numerous copper shows in the surrounding district, it being their opinion that the fall in the value of lead was only temporary, consequently they did not feel justified in breaking up their homes and leaving the district, when there was every probability of the mines, in the near future, resuming work and again employing the full complement of men.

So far, none of the parties subsidised by the Prospecting Vote have been successful in their efforts to open up a payable mine. At the same time, a number of men have made a living and some of them good wages on these small copper veins, and may eventually open payable mines.

A prospector's life in this part of the country is a very hard one, particularly at this time of the year, there being no grass and very little water, which, in many cases, has to be carted 8 or 10 miles from the nearest dam to the claim.

At the beginning of 1901, 7,405 men were employed on the mines in and around Broken Hill, but owing to the great depression in the market value of lead, combined with the complex nature of the sulphides, the number of men employed have gradually fallen off, until at the end of the year only 5,008 men were working; and the depression is unlikely to pass off until there is a substantial rise in the price of lead, the heavy fall in the price of which has had the effect of closing down some of the mines. In others, although hands have been shortened and the mills hung up, development underground has been vigorously pushed ahead and improvements made in machinery and appliances, so that when work is again resumed a material saving will be made in the cost of treatment. The

The methods of stoping adopted are similar to those in former years, *i.e.*, square setts (usually on the rill principle) for friable and blocky ground, and close filling and bulk heads for hard floory sulphides.

The prejudice in favour of square setts still continues amongst certain of the miners who judge by appearance; but we are confident that, properly worked, the bulkhead system is infinitely safer in those hard sulphide stopes.

Delprat's shaft has been sunk to the 650-foot level; it is a fine shaft, and has been equipped with a first-class winding engine.

The Block 14 Company has been compelled to limit its output very considerably owing to the fall in the price of lead, and a large number of men have been put off; at present only two shifts are at work.

The British Mine was in full swing up to July, when all the stopes and ore faces were stopped, and only prospecting and development work continued. Since then a crosscut has been put in west from the No. 2 shaft at the 500-foot level, and has opened up a largo body of good grade ore about 60 feet wide. They have driven on it north and south, and proved it to be a lenticular body going north, while in the south end it is still showing a strong face. A crosscut put in at the 600-foot level from the same shaft, and running diagonally with that at the 500-foot level, has not yet cut the ore body; but as the hanging wall is lying very flat they may cut it yet. The mill is still idle, and there is no chance of it starting again until the price of lead rises.

The Junction Mine has been shut down throughout most of the year, but work is to be recommenced shortly.

The Junction North Mine was also shut down until the middle of the year, when men were put on to crosscut at the 1,050-foot level: however, owing to the shaft being out of repair and requiring to be overhauled, this work has been stopped, and the men are now repairing the shaft from the 200 to the 700-foot level.

The North Mine was also shut down throughout the year. The poppet heads have been pulled down and new legs erected, which are much higher and more substantial than the old. A coal lift (worked by friction winch) has been put in to raise the coal from the railway siding to the level of the boiler floor, and the expense of carting it up a steep hill thus done away with. New winding and compressor plants have been erected, and the whole of the concentrating plant remodelled and renewed. The only work underground consists in sinking a mullock shaft for filling purposes. The Victoria Broken Hill is still prospecting by and cutting at various levels and sinking the main shaft so far without success.

The Australian Broken Hill Consols Company has been prospecting throughout the year, but without very much success, except in the early part of the year. The peculiar nature of the occurrence of the silver in this mine renders it patchy, and if a patch of silver be discovered enough can be got out in a week to repay for a whole year's work. This is shown very clearly by their returns in the table of statistics, where 5 tons of ore yielded 35,350 oz. of silver.

At the open cuts on the Broken Hill Proprietary Mine the hands have been considerably decreased, and the workings on the south end of the mine will probably be completed by the middle of the coming year. The cuts have been of very great convenience, not only for supplying oxidised ores, but also for mullock to fill up the depleted stopes underground. Machinery and boilers have been considerably increased; also air compressors, rock drills, and rock breakers. The machinery is generally in good order, and the steam boilers have been regularly tested and cleaned as required by the Act. The baths and changing houses are kept clean and in good condition, and are ample for the requirements of the mine, but are not used as freely as would be expected in this hot and arid climate.

Lead-poisoning has very materially decreased for the year; only twelve cases have been reported. The accidents reported to us during the year are twenty-two fatal and forty-eight serious; there were also a number of others of a very slight nature not worth recording in this report, but all accidents, no matter how trivial, have been reported to you, showing cause and extent of injury.

A very large portion of these accidents could have been prevented with a little more care on the part of the workmen.

The industry has had a very serious set-back by the fall in the value of metals; but underground the mines have never been opened up as at present, and so many strong faces of ore standing, which, with metal at a fair price, ensures the permanency of the district for many years to come.

The number of the men employed at the beginning of the year in the Broken Hill district was 7,405, and gradually decreased until the end of the year was reached, showing that there had been a falling off of 2,723 between January and December.

We have enclosed in tabulated form the statistics for Broken Hill.

We have, &c.,

DAVID MILNE, } Inspectors of
J. R. GODFREY, } Mines.

The Chief Inspector of Mines.

STATISTICS of Broken Hill Mining Industry, 1901.

Name of Mine.	Tonnage of Ore Raised.	Cubic yards of material removed from open cuts.	Cubic Yards of filling put into depleted Stopes.	Superficial feet of Timber used.	Lineal feet of Driving, Sinking, &c.	Quantity of Explosives used.	Value of Explosives, including Fuse, Caps, &c.	Number of Detonators used (shots fired).	Number of Coils of Fuse used.	Horse Power of—		Total Value of Plant on the Mine.	Value of Plant Erected during the year.
										Engines.	Boilers.		
Victoria B.H. . .	.....	.....	.....	2,300	341	1,400	140	1,600	210	49	35	5,186	2,979
North B.H. . .	16,138	.....	674	171,434	57	3,850	363	5,500	900	562	800	26,081	15,843
B.H. Junction N. .	3,890	958	1,193	142,775	157	3,100	273	3,400	394	212	200	31,251	110
B.H. Junction . .	6,724	.....	3,704	133,597	316	2,600	210	3,000	250	144	224	34,990	6,474
A.B.H. Consols . .	5	.....	800	.....	717	4,032	343	4,000	600	100	56	9,000	.....
British B.H.P. . .	53,886	.....	40,000	554,474	3,094	35,100	2,369	39,200	5,183	950	550	70,000	.....
Block 14	85,941	.....	42,970	695,457	2,087	23,700	1,936	42,000	4,425	600	800	50,000	.....
B.H. Proprietary .	602,081	283,166	107,496	5,569,231	4,541	164,770	10,636	187,100	27,175	4,000	4,700	192,535	10,722
Block 10	148,295	.....	28,331	2,000,000	1,854	44,125	2,878	70,000	9,000	1,000	800	45,000	5,000
Central	246,621	52,483	52,483	2,763,829	1,581	76,412	4,705	116,300	13,155	820	820	91,909	5,095
South	102,669	12,800	13,000	1,093,445	1,745	37,590	2,791	43,300	5,771	448	636	60,700	30,372
South Blocks . . .	2,192	.....	.....	2,486	.....	2,935	234	5,300	593	20	90	996	996
Total	1,268,442	349,407	290,656	13,134,028	16,490	390,614	26,878	520,700	67,262	8,905	10,011	607,648	67,591

Mr. Inspector Hooke's Report.

Sir,

Sydney, 31 December, 1901.

I have the honor to submit a report on the condition of the mineral industry in the Western District during the year 1901.

As in former years gold mining provided the greater number of men with employment, but a considerable reduction in this respect has occurred; copper mining, however, increased in importance, whilst silver has continued dull—very few men being engaged mining for that metal. A larger number were occupied in obtaining ironstone and limestone than formerly, whilst the numbers of miners employed in connection with tin, bismuth, marble, and diamonds were insignificant.

The total number engaged in the district was, approximately, 7,500.

In the district under review, Burraga was the largest producer of copper, which almost wholly came from the Lloyd Copper Company's mine, the latest developments in which proving very satisfactory. The main shaft, (underlie) now the deepest in any metalliferous mine in the State, has reached a depth of 1,750 feet, from which several levels have been opened disclosing ore of high grade for the full length driven, viz., 700 feet. During the year in excess of 20,000 tons of ore were raised and partially reduced on the mine, the resulting matte being sent to the Company's refineries, at Lithgow.

At the mine the surface works have again been remodelled, the whole of the blast furnace plant which had been erected was abandoned without ever being put into work, and in lieu of it an entirely new reduction and concentration plant has been put into operation with a capacity of 50 tons of ore per day, operated by a powerful steam engine of tandem compound type and steam boiler of Babcock and Wilcox design. An extensive reservoir of water has been obtained by constructing a concrete dam across Thompson's Creek—about 2 miles distant from the mine, and at an elevation above it,—permitting of the flow of water to the latter by gravitation. On the hill-side at the mine several thousands of tons of firewood have been stacked awaiting use in the several new reverberatory furnaces and mechanical roaster which during the year have been erected, and in connection with which provision has been made for a Bessemerising plant, the whole forming probably the largest copper ore reducing plant in the State.

The Blayney Copper-mining Company continued operations up to the close of the year, when, as a result of the drop in price of copper, it was decided that mining work for the time should be discontinued. During the year the mine developments have been extensive and, the owners state, satisfactory. The main shaft is now down to a depth of 390 feet from surface, which places them well below the zone of surface alteration, and the bottom level shows the existence of sulphides in quantity. The mine is fully equipped with first-class modern machinery, including several reverberatory and two blast furnaces.

Other districts, including Essington, Mountain Run, Red Hill, Belmore, Wiseman's Creek, Tuglow, Condoblin, Trundle, Molong, and Wellington contributed towards the output of copper, but not in large quantities. Furnaces for reduction purposes were erected at Belmore and Wiseman's Creek, the former, however, was of an experimental character and was unsuccessful.

Prospecting new sites for copper ore was continued during the year with much activity, notably at Mt. Bulga, near Orange, where the company of that name completed a shaft to a perpendicular depth of 200 feet, and has driven along the formation for some distance. The mine has been furnished with steam winding and air-compressing plants and other machinery, and the company was actively engaged in development work when the fall in copper values occurred, causing a curtailment of operations. At Diamond Hill, near Byng, a company was formed to test a site located there by driving and sinking, but, so far, it has failed to disclose ore in sufficient quantity to establish a mine upon.

In the vicinity of Cowra a valuable discovery of copper ore was made during the year in the Illunie Mountains, and several parcels of high-grade ore have been despatched for treatment from the "King of England" mine, recent developments in which indicate a large extent of ore body.

Some curious sources from which copper, lead, &c., were won during the year were the old furnace dumps at the Mount Costigan, Cordillera, and Peelwood abandoned mines, fully 50 men being engaged turning these over and picking slag therefrom, which was sent to Sydney for the extraction of the metallic contents.

In gold mining there is but little to record that is novel, and a review of the various localities forces the conclusion that exhaustion of alluvial deposits and shallow quartz mines is rapidly occurring, with a consequent diminution of gold output, nor can it be claimed that dredge mining has been prosperous in my Division. Nine dredges, all of bucket type, have been put into work, five on the Macquarie, three on the Turon, and one on the Fish River.

But one sluicing claim is working with the aid of machinery, the balance of the alluvial mining being mostly fossicking in character.

Quartz mining continues to fluctuate considerably, as, although fresh finds prove as attractive to miners as formerly, still, so soon as they find that their claims are not immediately remunerative, and failing to obtain wages employment, they turn to other occupations.

During the year several new batteries have been erected, and about 750 stamps are working in the district.

The following brief notes will serve to show the progress or otherwise made in the vicinities mentioned.

At Orange but little was done at the Lucknow Mines, the amalgamation of the various companies not having been completed. In the D'Arcy Mine, however, some rich stone was located in the continuation of the veins which yielded so well in the adjoining Wentworth Mines. At Rosedale and Mount Shorter, Moppett's mine has been developed to such an extent that the erection of crushing machinery is now contemplated. No stone was raised from the Pride of the Hills, but a new main shaft was started. The Mount Shorter Mine sent away several small parcels of stone for treatment, which yielded over 2oz. of gold per ton. The other claims in the vicinity have closed up except those in receipt of aid from the Prospecting Vote. The Wolaroi Company is still persevering in its efforts to locate something payable in the contact joint, which passes through their ground. At Forest Reefs most of the older mines were idle during the year, but the La Carabine and Century have developed sufficiently well to cause the erection of batteries to crush their cemented alluvial wash, which latter was supplemented by small quantities from the Carbine. A company to work the Wire Gully Reef has also been formed, and is engaged in development work. Other operations in this district have been insignificant.

In

In the Canoblas Mountains the Coolgardie Syndicate has worked steadily throughout the year, and has produced a fair quantity of gold. The mine is now equipped with its own battery.

At Blayney very little gold was obtained, and this was mostly from King's Plains and vicinity. The old Confidence Mine is now held by Collins and Party, who contemplate the erection of a cyanide plant. The Last Chance has been further developed during the year, and should again take its place as a productive mine. The Star of the West has not yielded gold to any extent of late, and for months has lain idle, but the battery has been engaged crushing stone from various veins in the locality.

At Carcoar mining operations were wholly confined to the ironstone deposit worked by Messrs. Links and Sons, the output being considerable, but a much greater demand could have been met.

The Gallymont Gold Mines have been still further developed, and have reached a depth of 450 feet, the results being such that the erection of a battery has been decided upon. The other and smaller mines in this neighbourhood have contributed a fair quantity of gold during the year, as was also the case at the Lyndhurst Mine, which has added to the plant for treating sulphide ores.

At Burnt Yards nothing but fossicking is the rule, except at the old collapsed Prince of Wales Mine an attempt to re-open same with a new main shaft being retarded through want of funds.

At Wood's Flat, near Woodstock, a battery has recently been erected to crush stone from the several veins opened near by, but operations here as elsewhere were greatly hampered by want of water.

During the year Mount M'Donald has gone further back in importance. An attempt was made to test at a greater depth than formerly open, but it met with such a small measure of success that the vein was not worked to any extent.

The Canowindra quartz veins also have yielded but poorly during the year, and no discoveries were made, but at Cargo, the M'Mahon Brothers located a gold-bearing formation of large dimensions on Adelaide Hill, trial crushings from which yielded 1oz. per ton. At Burdett the gold mine of that name has been extensively developed during the year, and the machinery added to.

In the vicinity of Forbes, continued dry weather conditions have prevented progress, but the Lachlan Gold Mine kept working throughout the year, while the adjoining property, including the Nil Desperandum, has been further opened by a new main shaft.

The Parkes district has been excessively dull, all the older mines being almost wholly idle. At the Kohinoor, now 800 feet deep, shaft sinking is still in hand. At the Phoenix the tributers, having completed their term, failed to obtain an extension, and the mine is now so dilapidated as to need a complete re-opening. The Phoenix East has so far failed to find anything payable, but efforts are being continued. The Dayspring now has its own battery working, and is steadily raising stone. The Bushman is still idle, and the Avoca has been completely dismantled and abandoned. New veins were opened during the year in Possum Gully, notably Steen and Callaghan's, which yielded several 2-oz. crushings.

Nothing but fossicking is being done at Alectown, while Peak Hill is also idle, other than at the local cyanide works and the Proprietary Mine. It was much hoped for that the negotiations for the sale of the mine to an English company would be successfully effected, as the "Hill" contains large possibilities, if in the hands of a concern financially strong enough to avail themselves of the knowledge already gained of the distribution and character of the various ore bodies. No discoveries of note have been made during the year in this locality, which is rapidly becoming an agricultural one.

At McPhail, the Myalls Mine has added an additional twenty head of stamps to the forty already erected. They were also engaged in necessary development work, which latter, however, was as much prospecting in nature, and had not resulted as satisfactorily as desired.

Tomingley has been quiet during the year, nothing additional being opened.

At Bodangora, however, the principal gold mine in the State, viz., the Mitchell's Creek Gold Mine, has been busily engaged erecting a new 40-head stamp mill, with all the latest and most approved accessories. The main shaft has also been cut down, making it of a size large enough to permit of an increased output of stone, to handle which a new winding engine has also been erected. Below surface the latest developments are highly satisfactory, and this, taken with the opening from surface of another vein in close proximity, gives promise of a successful future to this already extensive mine. The main shaft is already below the 1,000-foot level, at which the stone shows no diminution in size or gold contents, while in length the shoot has been worked for a distance of fully three-quarters of a mile. In the same district as the foregoing, another mine of much promise has been opened, viz., Cox's Commonwealth, from which a large tonnage of ore, containing gold, silver, lead, and copper, has been despatched for treatment, and with satisfactory results.

At Stuart Town and vicinity mining has been so stagnant that no progress can be recorded. The Mascotte Mine has been abandoned, and the plant is to be removed.

Newbridge has not had any mine working during the year nearer than Edgley's Caloola, in which operations continued uninterrupted.

At Trunkay all quartz-mining has ceased, while at Tuena that class of mining leans entirely on new discoveries, of which several have been made, some, notably Markham's Hill, yielding very coarse gold.

Near Bathurst, at Clear Creek, during the year fully thirty quartz claims were opened, and three batteries erected. None of these mines, however, excel Sinclair and Wilson's, the output from which during the year exceeded 1,000 tons, yielding in excess of 25 dwt. per ton.

Wattle Flat has disclosed nothing new in quartz-mining, and the gold output is derived from the older mines and fossicking in alluvial ground.

Sofala has no quartz mine working, and, apart from the dredges, nothing but small alluvial claims. At Box Ridge, however, the Turondale Mine has been equipped with a battery, and has now taken a place amongst the gold producers.

Hill End has not improved its position, all the older mines lying dormant and the batteries finding employment in crushing stone obtained by picking from the mullock tips. The Canton Mine has continued prospecting, as also is the case in Marshall's claim. Across the River from the Hill, the Root Hog, Lancashire Lass, and other claims set on the "Mare's Nest" and "Peach Tree" lines of reef have been revived, and seemingly with advantage, judging by the returns from the crushings obtained from those mines.

At Hargraves the Saddle Reef still occupies the most prominent position, as does the Golden Lily, at Windeyer, both of which mines continue to yield well, but in each case development is slow, owing to limited capital for that purpose.

The Mudgee district is rapidly losing its mining character, and land formerly devoted to that purpose is now being applied to farming, &c.; such is also the case at Gulgong, neither place producing gold other than in comparatively small quantities, nor has there been any discovery to note during 1901.

The Leadville and Cobborah Mines have been idle, but prospecting has resulted in some discoveries with possibilities in them.

The Sunny Corner district did not open any new mine of note, but the Big Hill Mine has changed ownership and will enlarge its operations. The Paddy Lackey increased its output of gold during the year, and in addition has acquired the adjacent mine workings. Operations were also renewed at the Sunny Corner Silver Mine, one blast furnace being put into work on the ore, which for some time past had been stacked on the surface.

At Black Bullock Mountain, Messrs. Buckland's mine was working throughout the year, but the output was small.

Other centres were visited in connection with applications for aid from the Prospecting Vote.

I have, &c.,

HENRY HOOKE,

Inspector of Mines.

The Chief Inspector of Mines.

Mr. Inspector Polkinghorne's Report.

Sir,

Sydney, 13 January, 1902.

I have the honor to submit my report in connection with the work performed by me during the year ending 31 December, 1901.

In the south the localities visited by me were:—Araluen, Alum Creek, Bega, Bodalla, Bredbo, Bombala, Bungendore, Braidwood, Burrowa, Cooma, Cowra Creek (Cooma), Cootamundra, Cullinga, Delegate, Grassy Gully, Jingera, Kiandra, Moruya, Mogo, Major's Creek, Murrumburrah, Nerriga, Nubba, Nelligen, Narooma, Nowra, Nanima, Pambula, Queanbeyan, Rye Park, Tilba Tilba, Wagonga, Wyndham, Wolumla, Yass, Yalwal, Yambulla, and Yerranderie.

In the west:—Canadian, Dandaloo, Gulgong, Hill End, Home Rule, Hargraves, Long Creek, Leadville, Mudgee, Mayfield, Rylstone, Stringy Bark, and Windeyer.

There have been no new discoveries reported during the year in the centres visited by me.

The development of the lodes and veins at Yambulla has not been carried on with such activity as anticipated in my report for year 1900, but a fair amount of sinking and driving has been done, with fairly good results. About 3,000 tons of stone have been crushed for a yield of about 5,000 oz. of gold, valued at about £14,500; 120 men are employed, principally in co-operative parties, the Yambulla Gold-mining Company being the only employer of note. The most successful party on the field has been Delaney, Durham, and Party, at Squirrel Flat, about 6 miles from Yambulla Post Office, they having raised from an open cut, and had crushed, 120 tons of stone for a yield of 400 oz. of gold, valued at £1,200. Roberts and Party, on Spion Kop, have also been raising good stone from the 70-foot level in their shaft.

At Cowra Creek (Cooma) some fair returns have been obtained from the mineralised stone (sent to Cockle Creek and Dapto) raised from the sinking below the water-level.

At Utopia, in the Nerrigundah Division, a fair amount of work has been done, and good results obtained. A ten-stamp mill has been erected on the Tuross River, which has enabled the prospectors to get their stone crushed at a reasonable cost. Encouraging reports should be heard from this field in the coming year. At Nerrigundah an improvement has taken place in reefing. At Tinpot, Latty Bros. have met with fair success, their reef promising to prove a permanent one.

In the Nelligen Division a slight improvement has taken place at Brimbramulla and should show further progress during the coming year.

The efforts of the Wolumla Gold-mining Company have not been attended by any great measure of success, the operations during the year not having disclosed any large payable bodies of ore. At present the mine is under suspension of the labour conditions to enable the Company to raise sufficient capital to sink the shaft to the 500-foot level, and cross-cut the lode bodies at that depth.

The dredging industry has grown steadily during the year, six new dredges having been added to the number previously erected, making fourteen in all in the Southern District. Two new centrifugal plants have also been started during the year, the Jerricknorra on the Shoalhaven, and the Half Moon on the Little River. No work was done by the Federal plant during the last half of the year.

The only satisfactory report of success, following operations carried on by means of assistance from the Prospecting Vote, is from the Day Dawn Gold Mine in the Braidwood Division, the Company having succeeded in cutting the reef at the 300-foot level, which is said to be very good. At Cowra Creek (Cooma) several grants have been made, and from the success achieved in the sinking of the Democrat shaft, a company has been floated, with a fair amount of capital, to fully develop the mine at a lower level. At Yambulla, the Yambulla Gold-mining Company are sinking their main shaft with assistance from the Vote. From this grant and two or three others on the field great things are expected in the coming year.

The Mining Regulations have been generally complied with, and only four accidents, including dredge accidents, have been reported from the Southern Division.

I have, &c.,

JOHN POLKINGHORNE,

Inspector of Mines.

The Chief Inspector of Mines.

Mr. Inspector Carthew's Report.

Sir,

Hillgrove, 15 January, 1902.

I have the honor to submit my report for the year 1901, during which period I was engaged in the Northern District of the State. The places visited were:—Armidale, Ashford, Attunga, Bende-meer, Booroloug, Bonoo Bonoo, Bingera (Upper and Lower), Berries Creek, Bundarra, Bowling Alley Point, Bucca Bucca (Upper and Lower), Barraba, Bulladelah, Ballala, Copeton, Crow Mountains, Cobbadah, Coramba, Copeland, Cangi, Cobark, Corinda, Cullongolook, Chichester, Camp Fire, Coningdale, Dungog, Dungowan, Dalmorton, Deepwater, Drake, Enmore, Emmaville, Euklan, Europambela, Gilgai, Grafton, Glen Innes, Glen Elgin, Glen Reagh, Glen Morrison, Guy Fawkes, Gloucester, Gragin, Glendale, George's Creek, Hillgrove, Howell, Inverell, Kookabookra, Kramback, Kangaroo Camp, Lionsville, Limbri, Moonan Brook, Moonbi, Monkerni, Melrose, Manilla, Mann River, Mole Creek, Maitland, Nowendoc, Nundle, Nine Mile, Niangala, Nana Glen, Nana Creek, Nymboi-Narribri, Omadale Brook, Oakey Creek, Pine Ridge, Pendaroi, Pretty Gully, Paddy's Creek, Rockvale, Rivertree, Rocky River, Rawden Vale, Reedy Creek, Scone, Stewart's Brook, Solferino, Sawpit Gully, Spring Creek, Swamp Oak, Tingha, Tia, Tainworth, Tallawadjah, Tilbuster, Tenterfield, Taviton, Uralla, Undercliff, Walcha, Woolomombi, Wandsworth, Woolomin, Wilson's Downfall, and Yarras. During the year over 9,000 miles were travelled. The total number of mines visited were 356, and in connection with the Prospecting Aid Vote, 298 reports have been furnished by me. The Mining Regulations have been generally well observed, and accidents have not been numerous, only two being fatal.

Mining generally has not been so active in the Northern District as was anticipated at the close of 1900, but prospecting has been vigorously carried on throughout.

In the *Hillgrove District* the Baker's Creek Gold-mining Company has maintained its average output. The work underground has been principally confined to the northern portion of the mine, the results being very satisfactory. Early in the year the Company purchased the Baker's Creek Consols Mine adjoining, and owing to its close proximity this may be worked with advantage by the parent Company. Forty head of stampers have been continuously at work. The boilers from the late Consols Mine are being removed to the Baker's Creek Mine, after which it is intended to extend the crushing power by an additional twenty-five head of stampers, thus making a total of sixty-five head of stampers, which should considerably augment the output in the coming year.

The Hillgrove Proprietary Mines has deepened its main shaft to 653 feet below the tunnel level, and has opened out drives at levels corresponding with 8, 9, 10, and 11 of the Baker's Creek Mine. The reef cut at No. 11 is from 5 inches to 9 inches wide, and is considered payable.

The Sunlight Mine was idle for the greater part of the year. Work was, however, again resumed in November, but, up to the present, prospecting only is being done.

The New England Gold and Scheelite Company (late Hopetoun) has been engaged developing the mine during the year, and the results have been sufficiently encouraging to warrant the purchase of a crushing plant, and the Company is now erecting a 10-head stamper battery on the west side of the creek, near the mine, and, when completed, no doubt work will proceed on an extensive scale.

The Eleanor Gold and Antimony Company has been employing an average of fifty-two men, and most of the work underground has been let to tributers, the Company doing the crushing. An experimental start was made early in the year to treat the large accumulated heap of tailings by canvas streaks, with such success that the system has been adopted and is resulting profitably. The total amount derived from all sources, including gold, antimony, and white metal, &c., realised £8,000.

The Garibaldi Gold and Antimony Company has been prospecting during the year by sinking the main shaft to the 400-foot level, and cross-cutting to the reef, both at the 300-foot and 400-foot levels.

At the King Conrad Mine, *Bora Creek*, the main shaft has been deepened to 414 feet, drives have been opened out on the lode at 150-foot and 300-foot levels, and winzes are being sunk from the surface to connect with the drives at the 150-foot level. The concentrating machinery is nearing completion, and concentrating on an extensive scale is anticipated. The Conrad (Howell's) Silver and Lead Mine was, in the first part of the year, worked vigorously, but in the latter part, through being short of water, operations have been confined to development.

In the *Drake* district mining during the year has been much the same as in the preceding year. In November some little excitement was caused by a reported discovery of gold about 3 miles from Sandy Hills and 11 miles from Drake, near the Cataract River.

At the Leviathan Tin Mine, *Inverell*, a 5-head stamper battery has been erected, with a Wilfley vanner, to treat the ore. Mining operations are being carried on by an open face. This mine is resulting very profitably.

The Dalcoath tin lode, which adjoins the Leviathan Tin Mine, is owned by Wright Brothers, who have raised and stacked at grass 20 tons of crude ore, estimated to be worth £10 per ton.

Tingha.—Several parties are working in the vicinity of Topper's Mountain for alluvial tin. Browning and Party sank a shaft to test the deep lead, and bottomed at 145 feet. As the wash was dipping to the north, they continued the sinking of the shaft to 160 feet, and are now driving out north to meet the dip. Aid from the Prospecting Vote was granted to this party, and should they be successful, no doubt deep alluvial mining will prevail in the Tingha district.

Emmaville and district.—Silver-mining has been almost at a standstill in the Emmaville district, consequent on the closing down of the Webb's Silver-mining Company. In tin-mining, the Ottery Tin Mine at Tent Hill has maintained its regular output, with fair profit to the owners. The Silent Grove Tin Mine has been managed by Mr. A. McGillivray, and, although the deepest workings are perhaps not more than 100 feet, a very fair amount of tin has been forthcoming during the year. A 5-head stamp battery is used for crushing, with concentration by the Wilfley vanners, and Cornish buddles for treating the slimes.

Nine Mile, Deepwater.—Prospecting for the deep leads at Nine Mile for tin has been done by the Nine-mile Deep Lead Mining Syndicate, who bottomed the shaft at 158 feet. The prospects obtained were very encouraging, although the shaft was not in the deepest part. The wash was 14 feet in depth with fair prospects of tin disseminated through the whole depth. I am informed that future operations are to be directed towards deepening the main shaft and then driving out north-west to meet the dip. Should this be done profitable results will doubtless be obtained.

Bingara.

Bingara.—Gold-mining in the Bingara district has not been very brisk. An attempt is, however, now being made to test deep alluvial gold-mining, and with this object in view sinking is being done near the town, at Snob's Hill. At the close of the year the shaft had been sunk to about 50 feet in the basalt. Should this be a success and payable gold be discovered, a large scope of similar country is available for deep alluvial gold-mining.

Nearly all the mining at Upper Bingara is copper-mining. The Mount Everest Copper Mine, owned by Mr. Trewenack, is developing well, and promises to become a good mine.

The mine held by the Gulf Creek (Limited) Copper-mining Company has fully sustained the opinion expressed at the close of 1900. The mine has been successfully developed by sinking and driving, disclosing an enormous body of copper ore for stoping. The average crude ore is 9 per cent. of copper, and the output for the year has been 200 tons per week. Two hundred men are employed in and about the mine.

Prospecting is active in the vicinity, and copper mines of a payable nature may yet be discovered, other than the Gulf Creek, which may enhance the copper-mining industry in the State.

At *Wood's Reef* the Wilpena Copper Mine is developing satisfactorily.

Crow Mountain.—This gold-field has been almost deserted. In the early part of the year an impetus was given to mining as a result of a patch of gold being found in the Dodger Mine, but as it proved to be only a patch the interest soon fell off.

Nundle.—Mining for gold has been fairly active on this field. The Tamworth Gold-mining Company has steadily maintained its output of stone, with profitable results. Jarvey and Party have had favourable crnshings from their reef at Foley's Folly. Several other parties through energetic prospecting have been fairly remunerated.

Bowling Alley Point.—Mining at this place has been confined to alluvial mining and fossicking.

At *Attunga* the discovery of a gold-reef by Cairns and Party, which was reported by me in October, has resulted in the taking up and working of several other reefs in the vicinity.

Stewart's Brook.—There is nothing very interesting to report respecting this field, and mining has principally been confined to prospecting.

Moonan Brook.—Mining has not been very active at this place. Several crnshings taken by tributers from Fuller's Reef have been remunerative to the parties concerned. Several parties have been prospecting, some with assistance from the Prospecting Vote, but with no very appreciable results.

Copeland.—Mining on this field has been inactive, but recently a syndicate acquired the right to work the Prince Charlie Gold Mine, and its efforts, if successful, may revive the mining industry on what was an one time a very rich gold field. In connection with the Prospecting Vote I reported on a new discovery at Berries Creek, which is near the Gloucester River, and about 14 miles from Copeland. The reef has a north and south strike, and can be traced for 1 mile in length. Aid has been granted to test this reef by a tunnel, which may prove the same to be payable.

Dungog.—The Wonga Wonga Gold-mining Company at Wangat may, perhaps, be considered the most permanent reef in the district. This mine has been worked for many years by small syndicates, who, with limited capital, were unable to erect suitable machinery for the better extraction of the gold from a big low-grade reef heavily charged with pyrites, but during the year the mine was successfully floated into a company of 80,000 shares. The reef has been driven on by a low-level tunnel, a distance of 1,100 feet. Sinking below this tunnel is now being done, and the reef is improving with depth. Cyanide vats are being erected on the mine to treat the accumulated tailings. Tramlines are being laid from the mine to the battery, and when completed, this mine should be very profitably worked, and be remunerative to the shareholders.

Perhaps the mine next in prominence in this district is the Mountaineer Gold Mine, Upper Wangat. The reef was cut by a low-level cross-cut tunnel, and is now being driven on, and latest reports indicated that the reef was carrying good gold.

The *Niangala* and *Swampoak* Fields have almost a deserted appearance, there being only about twenty men in all at work at these places. Prospecting is being done principally with assistance from the Prospecting Vote, and may be the means of reviving gold-mining in these places.

Dredging has not been so active as anticipated, only three plants having come under my notice in the northern district. These were at Uralla; Cope's Creek, Tingha; and at Butter Leaf Creek, Glen Elgin. The dredge at Cope's Creek is winning tin, while those at Uralla and Glen Elgin are dredging for gold. The dredging regulations have been very carefully observed, and no accidents have been reported.

I have, &c.,

JOHN CARTHEW,

Inspector of Mines.

The Chief Inspector of Mines.

Mr. Inspector Whittell's Report.

Sir,

Sydney, 31 December, 1901.

I have the honor to furnish herewith my Annual Report for the year 1901.

The districts inspected by me during this period were—Adelong, Tumint, Batlow, Tumbarumba, Gundagai, Temora, Barmadman, Wyalong, Albury, Coolamon, Yalgogrin, and Kildary; most of them twice.

Adelong.—The chief mines working here are in possession of the Gibraltar Consolidated Gold Mines (Limited), and consist of the Gibraltar, Caledonia, Caledonia Extended, Hodson's Shaft, and the Challenger. The last four were purchased from local syndicates. The lode in the Caledonia Extended at the 110-foot level is as far as opened out from 20 feet to 25 feet wide. It is hoped that this promising-looking low-grade property will prove remunerative, especially as the company has gone to considerable expense in installing air-compressing and winding plants, &c.

Hodson's shaft, an old one, is being cleaned out and retimbered. A large ore body has been found. A small double-cylinder winding winch is erected here. Towards the latter end of the year the Gibraltar Mine itself has been let on tribute, many of the parties making more than wages. Near the township a few men are prospecting the old reefs, but with little result so far.

At

At Wandalga about twenty men are employed in various claims on a line of reef in the vicinity of the old Wandalga workings. Messrs. Purcell and Party and one or two others are on payable stone. Purcell's Mine is worked from a tunnel, now in about 100 feet, and a winze is being sunk. The other claims are of less importance at present.

At Mount Adrah a few men are working about the old claims with indifferent results. Alluvial mining of any consequence is represented by the Graham's Town Gold Estates. This ground was recently worked by the Jennings's Company with a centrifugal pump driven by steam and erected on a pontoon. The present owners have put more effective machinery on the barge, and hope to make the scheme a success, now that the preliminary difficulties have been overcome. Employment about the barge, &c., is found for forty-five men, besides wood-getters and others.

Tumut.—In this district, about the middle of the year, Gurney's mine at Wagragobilly was exploited by the Howell's Consolidated Gold-mining Company. A low-level tunnel was put in and the reef cut. The company decided, however, not to purchase the property.

At Billapaloola, a Tumut syndicate is prospecting a large quartz reef, and has erected a small battery on the ground. The stone is poor. The outlook as regards quartz-mining in this district is not bright.

Batlow.—Little else than alluvial mining in a small way is carried on here, and it is confined chiefly to the Main Adelong and Upper Adelong Creeks.

Tumbarumba.—In Pound Creek alluvial is being worked by a sand-pump, driven by a Pelton wheel, while on the main creek a similar appliance, driven by steam, is about to be erected. On the Burra Creek Messrs. Hedley and others are also installing a sand-pump and Pelton wheel. On the Tarcutta and Burra Creeks, and at Quartzville many men are earning a livelihood ground sluicing, while at the last named place is the only example of reefing in the district. It is known as the Premier Mine, and the vein is very large, the ore being low grade and pyritic. It is more in the prospecting stage, and the work is being done by Mr. Ramsay, of Tumbarumba.

Gundagai.—Although there is a good deal of money being spent in prospecting in this district, both by private individuals and the Government, the results of late are meagre.

Booth's Reward Mine, near Coolac, is still shut down, and the Sybil Mine, at Reno, is practically in the same condition. The Prince of Wales Mine, also at Reno, is worked mainly by tributers, and as the bottom levels of the mine are destitute of payable stone, and the diamond drill failed to cut any lode below the deepest mine workings, I am of opinion the day when this mine also will close down is not far distant.

Messrs. Robinson and Rice's mine, Kenny and Frewin's, and one or two other payable mines about Reno are in active operation, but only a few men are employed at each.

At Gobarralong, Quilter's Chrome Mine is still working with every prospect of continuance, regardless of the bumpy nature of the ore.

Groth's mine, at the head of Jackalass, is still yielding payable stone. The owner has erected a small winding engine. The workings are shallow.

Temora.—Hall's Reward Gold Mine is the only one of importance in quartz-mining. At Specimen Hill and one or two other places a living only is being made by the men, and at Sebastopol an attempt is being made to re-open the Morning Star reef. With the idea of testing the Temora Lead for a second or true bottom the Prospecting Board assisted A. L. Deutscher to sink a shaft. The usual brecciated clayey "bottom" was passed through, and at 240 feet bed rock (slate) was found. Unfortunately, wash was absent. Although gold was not found, a vexed question has been set at rest. The mining community have for a number of years been divided on the question as to there being a bottom other than the "clay one." It has now been demonstrated to them that the slate is the rock that must be struck before ground on this lead can be said to be proved.

Barnedman.—The Fiery Cross is the most important mine in this centre as far as employment to miners is concerned. The property is wet, and has been abandoned on many occasions; but it is hoped the present owners will make the venture pay. Messrs. Jackson and Party are on payable stone, and Steffani and Party have had rich returns from small parcels of ore.

Wyalong.—This field is the most important in the Southern District. The outlook towards the latter end of the year has been brighter, as a number of old claims have been re-pegged, worked, and found to contain payable stone. The mines on the Mallee Bull line of reef still occupy the premier positions as gold-yielders. The Brilliant and Lady Hampden Amalgamated has erected a steam winding plant. The property is not payable just now. Many of the claims are let on tribute, and some of them, notably the Golden Fleece, are on very good stone. The chief mines on the field are Neeld's, True Blue, Shamrock-cum-Waratah, Lucknow, Junction, Bantam-Lady Grace, Golden Fleece, and Great Britain. Beyond development, very little alteration has taken place about these mines. They are in a somewhat similar state to that of last year. Any remarks relating to their surface condition would therefore be recapitulation. The reduction works on the field appear to receive a good deal of patronage. Messrs. Duncan, Noyes, and Co., however, have dismantled a portion of their plant. The Prospecting Board is assisting Doyle and Party to continue sinking the shaft on their claim at Pine Ridge. Its depth at the time of granting assistance was about 160 feet. There exists a well-defined channel in diorite which, at the surface, in the early days of the field, yielded very good stone.

Yalgogrin.—Mining matters here are very quiet. The Picaninny Mine was shut down during the middle of the year, pending an effort to float it and other claims on the same line of reef into one company. The scheme ended in failure, and the Picaninny is about to resume sinking the main shaft from the depth of 222 feet, aided by the Department, for another 60 feet. Hill and Party are on good stone. The vein they are prospecting is at the junction of slate and granite, and promises well for permanency. The Black Coon, Democrat, and Eureka also are working.

Kildary.—There are a few prospecting claims here, but up to the present they have not developed into sufficient importance to deserve individual reference.

Buddigower.—The tin lodes here are poor in quality, and there is not much evidence of improvement. Associated with the cassiterite are small yellow gossan veins. Assays have revealed the presence of what would be highly payable silver were the ore in larger quantity. As this is not so, I am of opinion that it is unlikely a silver mine will be established on the field. McMillan and Party are receiving departmental assistance to sink on their tin lode.

Albury.—Mining operations are scattered and very limited in this District. Very little is doing at Black Range. The May Day, the deepest mine here, is idle. At Cumberona the claims of McPherson and party and McNaughton and party are working, while Miles and party are receiving Government aid to sink their 40 foot shaft to 100 feet. Butler and party, too, are receiving aid to sink at Woomargamah. The mining community has not yet bestowed attention upon the deep lead at Black Range, although the Department has proved the existence of two runs of gold there.

Coolamon, Grong Grong, and Narrandera.—There is not any mining of consequence at these places. The regulations in connection with metalliferous mining are generally adhered to.

I have, &c.,

E. C. WHITTELL,

Inspector of Mines.

The Chief Inspector of Mines.

Mr. Inspector Schloesser's Report.

Sir,

Cobar, 24 January, 1902.

I have the honor to furnish a report on mining operations in the Cobar District during the year 1901.

Work done.—Some 13,600 feet of sinking and driving, and some 3,000,000 cubic feet of stoping and open-cut excavation have been done. These operations provided 271,000 tons of gold and copper ores, and 57,000 tons of waste material, chiefly refilled into the depleted stopes.

The values and quantities of gold, silver, and copper produced are given elsewhere than in this report.

These quantities of ore were produced by eighteen mines, whilst twenty-seven other mines were occupied in development and prospecting work.

To perform the work of mining and extraction, including the supply of timber and fluxes, some 1,968 men were employed in the Cobar Mining District; but as the greater part of the copper produced leaves the district in the form of matte, this does not represent the total number of men actually concerned in the production of the copper output.

The ore and mullock was drawn from fifty-eight shafts and six open cuts by means of nineteen winding engines and thirty-seven windlasses and whips.

This ore subsequently underwent treatment in twelve smelting furnaces, water jacket, and reverberatory as regards the copper ores, and under 205 stamps as regards the gold ores, the tailings of the latter being treated in six cyanide works and one slime plant. Some of the copper ores—a small quantity—were concentrated in two plants previous to reduction by smelting. To perform the work of hauling, crushing, rock-drilling, blowing, and the various other operations of a mine, required the employment of sixty-five boilers, aggregating 2,586 horse-power, and, in addition to the nineteen winding engines, the steam from these boilers was employed in 107 other engines for pumping, compressing, blowing, &c. To raise the steam necessary for these operations, as well as for heating the air for hot blasts and for smelting purposes, 21,000 tons of wood fuel, 13,850 tons of coal, and 14,000 tons of coke were burnt.

To support the various excavations in the mines 4,200 tons of mine timber were used.

To provide water for steam-raising, as well as for milling and concentration purposes, the water from twenty-eight tanks, of a capacity of 319,000 cubic yards, was used—a supply that was inadequate to the demand, chiefly owing to the dry season.

The work occasioned four fatal accidents and three serious accidents, none of the latter, however, resulting in permanent disablement.

The supervision of the work, as regards the proper observance of the Mining Act, and also for reporting on applications for Government aid, necessitated 235 visits of inspection and entailed travelling 3,676 miles by train, buggy, and bicycle. These last figures, however, refer to only eight months of the year, from May—the month of my appointment to the Cobar District—until December.

The amount of work done, &c., must be taken as roughly approximate.

A short description of the progress of each of the forty-five mines of the district may be of interest.

The syndicate working the Great Cobar Copper-mine have continued their operations of mining, smelting, and development in a vigorous manner throughout the year. The ore, chiefly chalcoppyrites, has been won from some twenty stopes, the deepest point from which ore has been won being from the bottom of the new shaft at 892 feet deep. This is the deepest shaft in the Cobar Mining District, and the ore has every appearance of being equal to that of the upper levels in quality and quantity. The same system of supporting the stopes as that already described in former reports is still in use, viz., forming the levels between the two lines of log pig-styes roofed with logs, and filled above and around with a mixture of clay and gravel locally termed "tank dirt," from the fact that the excavations providing this filling material serve later for tanks. This system has been found so satisfactory that there is no reason to depart from it, and the only improvement suggested was to erect temporary stacks to support the roof where the ground was at all shaky, or where a width of 30 feet was exceeded. In anticipation of the new Act coming into force in 1902, safety catches and overwinding hooks and thimbles have been fitted to three of the four cages. The ropes have been periodically inspected, and no exterior faults are visible. The smelting plant has not been materially altered, and the blower shed has not yet been rebuilt, as the work has been so unremitting that there has been no time. The dry season of 1901 nearly caused the smelters to shut down twice. In the first case a supply of water was obtained from the tank of the Cobar Gold-mine, and in the second case by the timely rains of August. During 1901 two fatal accidents have occurred at this mine, one through a fall of ground, and the other through gross carelessness on the part of the victim. This mine has employed about 600 men continuously during the year.

Work has proceeded at the Cobar Gold-mine on a large scale during the year, employment for over 300 hands having been found. Ore to supply the 100-stamp mill has chiefly been stoped from the stopes above the 116 foot and 216 foot levels, and also a smaller quantity from the open cut. The stopes are in places over 30 feet wide, and the roof is secured by numerous stacks of timber, whilst the filling with leached tailings is kept within 6 or 8 feet of the roof. The mill and cyanide works have done good work during the year, and the slime plant has been successfully treating the large accumulation of slimes. Some trouble was at first experienced in the excessive wear of the pumps; but since these have been replaced by *Monte-Jus* no trouble has been felt. These *Monte-Jus* are essentially closed vessels, in which the liquor to be raised is introduced with air under pressure, and are an adaptation of similar appliances used

used in beet sugar-works on the Continent. Below the 216-foot level no further exploration has been made; the presence of copper in the gold ore at this level, and below it, is likely to prove an impediment to the ordinary methods of gold-saving. This mine is fortunate in possessing one of the largest artificial tanks in Australia, and has not, therefore, suffered from want of water.

At the Cobar Chesney Mine the work during the year has been chiefly that of proving the extent and value of the deposits of copper. Towards the end of the year some thousands of tons were sent to the Great Cobar works for treatment, but no systematic stoping operations have as yet been started. The concentration plant is idle, as the ore has not proved to be suitable. A new winding engine of modern design has been erected and works well. This mine has undoubtedly large and rich bodies of gold and copper ores only awaiting vigorous exploitation.

The New Phoenix Company has been prospecting on a small scale during the year, and has been successful in discovering some veins of good copper ore at the 288-foot level.

The Mount Pleasant Company has been steadily working some rich pockets of carbonates, grey ores, and sulphides of copper, and has been sending the produce to the Great Cobar works for treatment. Further sinking will no doubt prove the existence of better ore bodies by proper search and development.

The Young Australia Company has been working the gold ores at the Junction with the cupriferous ores with some success.

The Occidental Mine has been a consistent producer of gold from its huge low-grade ore bodies in the open cuts, and owing to exceptional facilities in breaking has been able to treat very low-grade ore at a profit. The mine is well equipped with mill winding engines and cyanide works. Work, however, has been interrupted by scarcity of water. The tank has been nearly doubled in capacity during the year, but is still not of sufficient size to store up water enough to last through the dry season. The open cuts have nearly perpendicular sides of 150 feet deep, and great care is taken to avoid all accidents from falls of ground.

At the Great Peak and Blue Lode, work has proceeded at the south end in the Conqueror No. 1 and No. 2 shafts, and gold has been won from various irregular bodies of slate. The old workings of the Blue Lode have been worked at a profit by tributers.

The Great Western Mine has been closed down during the year.

The North Cobar Mine has been sinking a shaft at the north end of the Great Cobar Company's mine to find the extension of their ore bodies. The shaft has been sunk 325 feet during the year, the intention being to crosscut at 400 feet deep to cut the line of lode. It is unfortunate that the work of sinking this shaft was not added to one of those already existing further to the east; there would then have been a better and quicker prospect of success.

Messrs. Wright and Dry and Messrs. Priest have also been sinking and prospecting in the vicinity of the Cobar Gold-mines, and have proved the existence of parallel bodies of low-grade ore similar to those of the Cobar Gold-mines, and of large extent.

In the Mount Boppy District the chief mine is the one of this name, and the work done for the year bids fair to place this mine in the first rank of gold-producers of the State. Equipped with a good mill and cyanide plant, and wisely and well managed by a first-class man (Mr. Vale), this mine serves as an object lesson on economy and methods to many others. The ore taken out to date constitutes a huge working sample of the mine as developed down to the 250-foot level. The whole width of the reef has been removed on the two levels to a height of 12 to 14 feet, and the ore thus obtained passed through the mill without any selection or grading. The result gives, therefore, a practical and reliable basis to estimate the value and quantity of the ore from the 250-foot level to surface. In the excavations thus formed, the levels are built of stout timber-sets with chambers for passes and winzes at intervals. The stopes are thus formed over the levels, and as the ore is taken out waste rock is run in from surface, thus securing the sides of the depleted stopes. The result referred to above has been highly payable for the year's work, and has justified the extension of the plant by erecting a further 40-head of stamps, making 80 in all, by the design and crection of a slimes plant and the laying out of the necessary auxiliary works, including the increase of water storage. The country being flat around the main shaft, the tailings from the mill are elevated by means of a large tailings wheel similar to many used on the Rand, but somewhat novel to the ordinary visitor. The supply of water, however, still causes anxiety, and a complete system of drains have been made to catch all water from a radius of 7 miles around the mine. The recent death of the manager is a real loss to the mining community; and such men, to whom the foundation and development of new sources of riches are due, can ill be spared. This mine was originally helped by Government aid, and is an example of the benefit of money wisely spent by the Prospecting Board.

Budd and party have found what is thought to be an extension of the Mount Boppy lode about a mile distant, and the ore gives good promise in quality and quantity at 150 feet deep. The reef at 150 feet was also found by help from the Prospecting Board.

Messrs. Grill and Pendergast have also been prospecting close to the preceding site, but have not yet found payable ore in any quantity.

Some 6 miles south-west a find of grey copper ore by C. Knight is being prospected on Government aid. Some rich bunches were found at surface, and prospecting is now proceeding for the lode.

In the same neighbourhood, Messrs. Saunders and Longworth's claim have been working similar bunches of rich grey ores, and have met with larger quantities than the discoverers—Knight Brothers.

Some 13 miles south-east, on Gurru Block, two parties of prospectors are searching for payable stone in likely auriferous country.

At Wilgar Downs, half way between Hermidale and Girilambone, B. Fleming has been receiving Government aid to prospect a gold reef, and has been successful in proving payable ore to 100 feet deep.

At Girilambone the chief mine is the copper-mine of that name. The work here has chiefly consisted in concentrating the carbonate and sulphide ores to a sufficiently high copper contents for sending away to smelting works.

No fresh developments of importance have occurred in this mine during the year. The ore concentrated has been chiefly drawn from the stopes at the 120-foot and 420-foot levels, as well as a small quantity from the open cut. There seems good promise of larger ore bodies of chalcoppyrites being discovered at and below the 525-foot level, but a vigorous policy of development is necessary for this, and whilst the metal market is so depressed is hardly to be hoped for.

Some 6 miles further west several small gold-mines have been intermittently working during the year, most of which have received Government aid at one time or other. These claims—The Comet,

Evening Star, Elletson's, Skinner's, &c.—have proved the existence of several payable reefs carrying gold. A syndicate of Cobar mining men have bought a battery, which is now being sent up to Girilambone.

The Restdown Gold-field has made little progress during the year, the only claims at work being The Girl in Blue and The New Reward. At the latter some good ore has recently been found.

At Nymagee the copper-mine of this name has been mining and smelting steadily during the year, in spite of the difficulties of transport of coke and materials. The stoping of the ore bodies has proceeded at the 414-foot, 516-foot, and 618-foot levels, whilst fresh ore has been discovered at the lowest level at 734 feet. The quality of the ore is still high, much of the material smelted being worth over 8 per cent. of copper. To the south the old Hardie's shaft has been reopened, and large quantities of good oxidised and carbonate ores have been proved. There is little doubt that, given the same transport facilities as Cobar, this mine would equal, if not surpass, the Great Cobar Mine in production. During the year a new water-jacket furnace was blown in, as well as a system of hot blast for partial pyritic smelting inaugurated. No fatal or serious accident occurred at this mine during the year, and this speaks well for careful work.

The North Nymagee Company has been trying to find payable copper or lead ore during the year, but, in spite of much honest and careful exploration, has not yet succeeded in locating payable bodies down to 350 feet deep.

The Nymagee ore bodies appear to become broken and irregular to the north, but it is at least surprising that no search has been made to the south for the continuation of these ores.

At Gilgunnia there are four or five small parties at work, the chief mine being Her Dream, which has had several good crushings for the year. The ore has been mined from a series of small threads of quartz, rich, however, in gold. The owners, mostly local, adopt the suicidal policy of dividing all the profits up to the hilt, and have formed no reserve fund. In consequence, when the present shoots are exhausted down to the 200-foot level, there will be dead work and water-baling to contend with, and no funds, except from calls on the money already paid out as dividends. The rest of the mines are chiefly prospecting in a difficult country, as the veins, though rich, are so small and irregular. About 2 miles south-west an old copper mine, the May Day, rechristened the Narragadore, has restarted with some prospects of success.

At Shuttleton, the new township on the Wirlong field, mining work has been more active, in consequence of the rich copper ore found by the Commonwealth Mine. This mine has proved a vein over 2 feet thick of rich grey copper ore, for 150 feet long by 100 feet deep. The width of the rich grey ore varies from $1\frac{1}{2}$ to 4 feet, whilst outside of this rich vein some 10 to 15 feet or more of highly payable, though less rich, ore has been found. The mine has chiefly confined its work to getting out the rich ore, bagging it, and sending it by team to Cobar for despatch to the smelting works. Five or six other parties of men are looking for the extension of the lode in adjoining claims north and south, but so far have only found small bunches of rich ore. A town site has been surveyed, and already contains the nucleus of a small village. The Commonwealth Mine gives fair promise of developing into a good lode, but until the chalcoppyrites are found, it cannot be considered as proved, except for its deposits of the richer grey ores, carbonate ores, and oxides of copper.

At Mount Hope the New Mount Hope Company has been working and smelting the carbonate and sulphide ores from the 150-foot and 270-foot levels. Part of this ore has been concentrated in the old plant before treatment in the reverberatory furnaces. Prospecting is also proceeding at the 340 feet level. A new concentration plant has been erected on the east side of the hill, but, from the design, it appears doubtful whether it will be successful without a great many alterations.

The Great Central Mine, 3 miles distant, has been steadily worked during the year. This company has had a difficult and tedious enterprise in exploring and locating the old workings, of which no proper plans existed, in securing and picking up old drives and shafts, and generally reorganising plants and surface work for future operations. A new and good main shaft has been sunk 300 feet, and has now been connected with all the other workings; the shaft has been equipped with a modern winding plant and poppet heads, and generally work has been organised in a first-class manner. The ores about to be worked by this mine are too low-grade for direct smelting, and a large concentration plant has been designed, and is now in course of erection. Most careful and painstaking concentration experiments, and smelting experiments on a small scale, have been made in great number, and if the problem of concentration of low-grade sulphide ores of copper is to be solved at all, this company have certainly taken all the precautions that science and forethought can suggest. A 50,000 yard tank has been excavated, but, owing to the prevailing drought, is still unfilled. Work at the mine is chiefly centred on building the concentration plant, and it is expected that this will be at work during 1902. The distance from the railway proves a great hindrance to the enterprise, both in time and expense.

The Double Peak, some 10 miles north of Mount Hope, has had very little work done during 1901. Hill's claim is much in the same state as at the beginning of the year, and the owners have confined their work to further proving the existence of a large and payable body of auriferous copper ore on their lease. The whole hill gives good promise of rich deposits, as good copper ore has also been found in Riley's claim at the north end of the hill. It would be a good field for development by judicious expenditure.

The old Mount Allen Mine, in which such great quantities of water were struck, has been taken up again by the Great Central, of Mount Hope, chiefly for the iron ores that will be useful for flux.

At Mount Drysdale the only mine of note is the gold-mine of that name. Several rich bunches of silver glance, carrying gold, have been found at the 200-foot, 300-foot, and 400-foot levels, and some of the poorer ores have also been crushed. Large quantities of low-grade ores exist in the mine untouched, the work having been confined to the search for the irregular pockets of rich ore. It seems probable that were the low-grade ores mined and crushed systematically, then any richer parts would thereby be also found, and this method would obviate the continual search in the dark for the richer pockets. The water supply has not allowed crushing operations to proceed for the whole year, but only for part. The old Billagoe Mine has been worked by tributaries in a tributer's style during the year, who have found a little rich ore. Other claims include Rankin's, Keogh's, and McDonald's, all of which are still searching for payable ore. It seems incredible that the Mount Drysdale and its neighbour, the Eldorado, should be the only payable mines of the field.

At Gundabooka, near the Darling, Messrs. Parker and party have proved the existence of several payable gold reefs.

At Bobadah the Overflow Mines have built a water jacket furnace for their complex lead ores, and also some refining furnaces. Smelting, however, has not yet started in a regular way, owing to want of flux, labour, and other causes. Little work has been done below ground for the year. The existence of rich complex lead ores has been proved, but no considerable quantity has been developed.

Prospecting is also proceeding at Yellow Mountain, 14 miles towards Condobolin from Bobadah. Some rich lead ore, similar to that found at Bobadah, has been found by Messrs. Gordon; but, owing to want of capital, further development is delayed.

On the whole the Cobar Mining District has made good progress during the year. Discoveries of gold have been made at Gundooka, Gurru Block, and Mount Hope, and of copper at Restdown and at Shuttleton, the most important of these being that of the Commonwealth Mine at Shuttleton.

The whole district labours under the great disadvantage of dry seasons, the water supply of the twenty-eight tanks, representing 349,000 cubic yards, being only sufficient to catch less than 0·001 per cent. of the rainfall of 1901.

What is wanted is, therefore, more tanks for the mines and especially deeper tanks, in order to minimise the great loss by evaporation.

The firewood supply and the mine timber supply has been drawn from the surrounding country, but this is fast becoming exhausted, and in the near future it will be necessary to depend almost wholly on coal and mine timber brought by railway; hence, for the outlying mines, the vital necessity of railway communication. Moreover, this wood fuel is burnt in a reckless and wasteful way. Few, if any, mines are equipped with modern "economiser" plants to make use of the waste gases, and little or no attention is paid to boiler and engine efficiency.

As the struggle against low grade and refractory ores and low prices for metal is getting keener year by year, only those mines equipped with the best and most modern plants, and employing men of the highest attainments in scientific and practical knowledge of mining, can hope for success.

I have, &c.,

ROB. SCHLOESSER.

Inspector of Mines.

The Chief Inspector of Mines.

Diamond Drill Sections for the Year 1901.

(Compiled from the Foreman's Weekly Report Sheets.)

Section of No. 1 Bore (No. 7 Diamond Drill) at Reno.			Section of No. 1 Bore (No. 13 Diamond Drill) at Otford.			Section of No. 1 Bore (No. 13 Diamond Drill) at Walsh Island.		
Nature of Strata.	Thickness. ft. in.		Nature of Strata.	Thickness. ft. in.		Nature of Strata.	Thickness. ft. in.	
Bored during 1900	53 3		Bored during 1900	305 6		Sand	88 0	
Porphyry ..	35 3		Blue and purple shale	23 0		Clay	5 0	
Hard blue porphyry ..	1 6		Grey and purple shale	30 0		Sand	45 0	
Hard blue porphyry with quartz veins ..	7 6		Blue sandstone	4 0		Clay	26 0	
Hard broken porphyry ..	3 1		Grey shale	21 10		Dark sand	21 0	
Hard porphyry ..	4 0		Grey shaly sandstone	12 5		Sand	5 0	
Hard broken porphyry ..	12 11		Grey sandstone	10 0		Dark sand	4 0	
Hard porphyry ..	21 3		Conglomerate	57 9		Sand	1 0	
Hard broken porphyry ..	6 3		Sandstone	8 0		Sandstone	26 0	
Hard porphyry ..	5 6		Conglomerate	27 0		Fine sandstone	34 6	
Hard broken porphyry ..	4 6		Grey shale	13 6		Shaly sandstone ..	12 0	
Hard porphyry ..	10 1		Shale	8 0		Dark shale	8 0	
Hard broken porphyry ..	4 9		Sandstone	5 3		Blue shale	38 6	
Hard porphyry ..	6 2		Conglomerate	2 0		Dark shale	48 6	
Hard broken porphyry ..	15 11		Grey shale	7 0		Shale ..	3 0	
Hard porphyry with quartz veins ..	32 11		Shale	7 0		Shaly sandstone ..	5 0	
Hard broken porphyry ..	5 3		Shale and sandstone ..	14 9		Dark shale ..	10 0	
Hard porphyry ..	11 11		Shaly sandstone ..	6 6		Shaly sandstone ..	19 6	
Porphyry ..	13 9		Grey and purple shale ..	8 0		Shale and sandstone ..	12 0	
Broken porphyry with quartz veins ..	54 9		Dark shale ..	6 6		Coal ..	0 6	
Broken porphyry ..	2 0		Shaly sandstone ..	14 0		Shale and sandstone ..	8 11	
Broken porphyry with quartz veins ..	11 6		Shale and sandstone ..	8 0		Coal ..	2 7	
Broken porphyry ..	28 9		Sandstone ..	27 8		Shale and sandstone ..	38 9	
Porphyry with quartz veins ..	6 8		Conglomerate ..	5 7		Inferior coal ..	0 5	
Broken porphyry ..	3 1		Shale ..	16 9		Coal ..	1 7	
Porphyry ..	66 9		Dark shale ..	4 0		Band ..	0 1	
Quartz ..	2 0		Inferior coal ..	2 6		Coal ..	0 4	
Porphyry ..	4 6		Volcanic rock ..	2 6		Chert ..	15 10	
Very hard porphyry ..	27 3		Inferior coal ..	2 6		Shale, with coal pipe ..	6 3	
Porphyry with quartz veins ..	39 2		Very hard sandstone ..	4 0		Shale ..	10 6	
Porphyry ..	787 10		Sandstone ..	3 6		Shale and sandstone ..	11 9	
Porphyry, very much broken ..	7 0		Coaly shale ..	2 6		Sandstone ..	15 9	
Porphyry ..	73 10		Dark shale ..	5 4		Shale ..	2 0	
Quartz ..	0 6		Shaly sandstone ..	8 0		Shale and sandstone ..	20 0	
Porphyry ..	18 8		Sandstone with dark shale bands ..	8 0		Shale ..	6 0	
Porphyry, very much broken ..	6 0		Sandstone ..	4 8		Shaly sandstone ..	32 9	
Porphyry ..	21 0		Dark shale ..	2 0		Shale and sandstone ..	15 6	
Soft porphyry ..	6 0		Sandstone ..	8 0				
Blue porphyry ..	2 0		Inferior coal ..	0 6		Depth at 31st December, 1901 ...	601 6	
Porphyry ..	61 0		Hard inferior coal ..	2 6				
			Volcanic rock ..	1 6				
			Hard inferior coal ..	1 6				
			Dark shale ..	6 6				
Total depth of bore	1,486 0		Total depth of bore	720 0				

COAL AND OIL-SHALE MINES.

Report on the Inspection of Mines under the Coal Mines Regulation Act, 1896, in the State of New South Wales, for the year ending 31st December, 1901.
By A. A. ATKINSON, Chief Inspector of Coal and Oil-Shale Mines.

Sir,

Department of Mines, Sydney, 19 March, 1902.

As required by section 21 of the Coal Mines Regulation Act, 1896, I have the honor to submit the following report of inspection, together with the usual statistical information in regard to accidents, and to coal and shale mining generally.

The report is divided into the following sections:—

- Section I. Persons employed.
- „ II. Output and export of mineral.
- „ III. Accidents.
- „ IV. Prosecutions.
- „ V. General remarks.
- „ VI. Inspectors' Reports, &c.

The quantity of coal wrought during the year amounted to 5,968,426 tons, the quantities in each District, and the comparative figures for the last year and the year 1900, being as follows:—

	1901.	1900.	Increase or Decrease.
	tons.	tons.	tons.
Northern District	3,999,252	3,926,584	+ 72,668
Southern and South-western Districts	1,544,454	1,265,055	+ 279,399
Western District	424,720	315,858	+ 108,862
Totals	5,968,426	5,507,497	+ 460,929

The quantity of oil-shale wrought during the year amounted to 54,774 tons, the quantities in each District, and the comparative figures for 1901 and the year 1900, being set out hereunder:—

	1901.	1900.	Increase or Decrease
	tons.	tons.	tons.
Northern District .....	.....	.....	.....
Southern and South-western Districts	411	966	— 555
Western District	54,363	21,896	+ 32,467
Totals	54,774	22,862	+ 31,912

The increase in the output of shale, as compared with that of the year 1900, is due principally to the operations of the New South Wales Shale and Oil Company in the extraction of oil for the Australian Gas-light Company at their newly-erected retorts at Torbane. It is satisfactory to note that, at the commencement of the present year, there were appearances of better trade for export shale, in consequence of which there was a considerable increase in the number of miners employed.

SECTION I. PERSONS EMPLOYED.

TABLE showing the number of persons employed in and about Coal and Shale Mines, divided according to ages and occupation below or above ground, and in the several districts.

Districts.	Number of Mines.	Below ground.			Above ground.			Total number of persons employed below ground and above ground.
		Ages.			Ages.			
		Boys under 16.	Males above 16.	Total below ground.	Boys of 14 and under 16.	Males above 16.	Total above ground.	
Northern	66	197	7,061	7,258	183	1,716	1,899	9,157
Southern and South-western	14	74	1,890	1,964	21	534	555	2,519
Western	20	4	566	570	16	153	169	739
Totals, 1901	100	275	9,517	9,792	220	2,403	2,623	12,415
Totals, 1900	100	364	8,741	9,105	237	2,149	2,386	11,491

These figures are obtained from the statutory returns made by the mine owners under section 27 of the Coal Mines Regulation Act, 1896; but as many of the returns are not received on the date required by the Statute, great inconvenience and delay are caused in making up the statistics and completing the Annual Report.

This table shows an increase of 924 persons employed, or 8.04 per cent. above the year 1900.

In consequence of the remissness abovementioned on the part of managers in not sending in their annual returns on the 21st January, as required by section 27 of the "Coal-mines Regulation Act," it will be my duty, if this continues in the future, to ask the permission of the Secretary for Mines to take proceedings, in order to impress upon those responsible the necessity of sending in the returns when due.

SECTION II.



THE NEWCASTLE COAL MINING COMPANY'S A PIT MEREWETHER.
(General view.)

SECTION II.
OUTPUT OF MINERALS.

TABLE showing the output and value of Coal and Shale from mines under the Coal Mines Regulation Act, 1896, in the State of New South Wales, during the year 1901.

Output.

Districts.	Coal.	Oil-Shale.	Shale used for other purposes.	Total.	Value at mine.		
	tons.	tons.		tons.	£	s.	d.
Northern	3,999,252	.....	.....	3,999,252	1,669,519	2	9
Southern and South-western	1,544,454	411	.....	1,544,865	407,749	17	6
Western.....	424,720	51,363	.....	479,083	143,149	10	6
Totals, 1901	5,968,426	54,774	.....	6,023,200	£2,220,418	10	9
Totals, 1900	5,507,497	22,862	.....	5,530,359	£1,689,562	16	7
Increase	460,929	31,912	.....	492,841	£530,855	14	2
Decrease .....	.....	.....	.....	.....	.....	.....	.....

TABLE showing the quantity of Coal and Shale raised per person employed in and about Mines under the Coal Mines Regulation Act, 1896, in the State of New South Wales, during the year 1901 :—

Quantity raised per person employed.

Districts.	Below-ground.	Below and above ground.
	tons.	tons.
Northern	551	436
Southern and South-western	786	613
Western	840	643
	615	485

The corresponding figures for 1900 were 607 tons per person employed below-ground, and 481 tons per person employed below and above-ground, whilst for the United Kingdom the figures (for all mines under the Coal Mines Regulation Act) for the year 1900 were 382 tons per person employed below-ground, and 305 tons per person employed below-ground and above-ground.

Showing coal and shale separately, we obtain the following figures :—

Quantity raised per person employed.

Districts.	Below-ground.		Below and above ground.	
	Coal.	Shale.	Coal.	Shale.
	tons.	tons.	tons.	tons.
Northern	551	.....	436	.....
Southern and South-western	793	22	618	20
Western	965	418	793	266

All these figures are satisfactory, except those in respect of shale in the Southern and South-western Districts, and these are abnormally low, on account of the Australian Kerosene Oil Company's Joadja Mine having only worked a portion of the year. The output per person employed at all the coal-mines is satisfactory, in consequence of the pretty regular working of the collieries during the year, except towards the end, when trade was not quite so brisk.

COMPARATIVE Statement of Coal Returns for 1900-1901.

	Men and boys above ground.	Men and boys below ground.	Tons of round and small coal.	Value at mine.		
			tons.	£	s.	d.
Northern, 1901.....	1,£99	7,258	3,999,252	1,669,519	2	9
„ 1900	1,738	6,817	3,926,584	1,246,011	10	0
Increase.....	161	441	72,668	423,507	12	9
Decrease .....	.....	.....	.....	.....	.....	.....
Southern and South-western, 1901	553	1,946	1,544,454	407,195	17	6
„ „ 1900	522	1,802	1,265,055	314,811	18	0
Increase.....	31	144	279,399	62,383	19	6
Decrease .....	.....	.....	.....	.....	.....	.....
Western, 1901	95	440	424,720	102,214	4	0
„ 1900	73	381	315,858	78,037	15	7
Increase.....	22	59	108,862	24,126	8	11
Decrease.....	.....	.....	.....	.....	.....	.....

The Northern District during 1901 thus shows an increase of 602 persons employed, and an increase of 72,668 tons of coal raised. The coal trade of Newcastle dropped off during the last three months of the year, otherwise the output would have shown a still greater increase.

The Southern and South-western District shows an increase of 175 persons employed, and an increase of 279,399 tons of coal raised.

The Western District shows an increase of 81 persons employed, and an increase of 108,862 tons of coal raised. The coal trade in the West is still somewhat interfered with by the insufficient supply of railway trucks, but it is hoped this will soon be obviated by the duplication of the railway over the Mountains, and possibly also by the adoption of some scheme to facilitate traffic over the Zig Zag.

The following statement affords a useful comparison between the quantities and values of coal exported and used for home consumption in the State during the past four years, also particulars with reference to the output of coal, tons raised per person employed, and tons raised per each life lost for the same period :—

Years.	Exports to Intercolonial Ports.			Exports to Foreign Ports and United Kingdom and other British Possessions.			Total Exports.			Home consumption.
	Quantity.	Average per ton.	Value.	Quantity.	Average per ton.	Value.	Quantity.	Average per ton.	Value.	
	tons.	£ s. d.	£	tons.	£ s. d.	£	tons.	£ s. d.	£	tons.
1898	1,629,072	0 6 9 18	551,083	1,162,724	0 7 0 95	411,585	2,791,796	0 6 10 75	962,668	1,914,455
1899	1,624,137	0 6 9 81	553,629	1,174,386	0 7 8 40	452,165	2,798,523	0 7 2 25	1,005,794	1,798,505
1900	1,973,580	0 7 2 92	716,585	1,380,752	0 8 0 03	556,449	3,363,332	0 7 6 68	1,273,034	2,138,165
1901	2,119,538	0 9 3 00	981,139	1,351,447	0 10 4 04	700,685	3,470,985	0 9 8 28	1,681,824	2,497,441
	7,351,327	0 7 7 49	2,802,436	5,069,309	0 8 4 41	2,120,884	12,430,636	0 7 11 05	4,923,320	8,348,566

Years.	Total output and value.			Coal raised per each person employed in and about the mines.			Value of coal raised per each person employed in and about the mines.			Tons of coal raised per each life lost.		
	Quantity.	Average per ton.	Value.	Quantity.	Average tons per each person employed.	Persons employed.	Value.	Average value per each person employed.	Persons employed.	Quantity.	Average tons per each life lost.	Lives lost.
	tons.	£ s. d.	£	tons.	tons.		£	£ s. d.		tons.	tons.	
1898	4,703,251	0 5 4 85	1,271,832	4,706,251	459	10,258	1,271,832	123 19 8	10,258	4,706,251	188,250	25
1899	4,597,028	0 5 9 21	1,325,799	4,597,028	444	10,339	1,325,799	128 4 7	10,339	4,597,028	510,781	9
1900	5,507,497	0 6 0 72	1,668,911	5,507,497	486	11,333	1,668,911	147 5 2	11,333	5,507,497	229,479	23
1901	5,968,426	0 7 3 61	2,178,929	5,968,426	489	12,191	2,178,929	178 14 7	12,191	5,968,426	351,084	17
	20,779,202	0 6 2 44	6,445,471	20,779,202	470	44,121	6,445,471	146 1 8	44,121	20,779,202	280,800	74

OIL-SHALE.

Western and South-western Districts.

Quantity of oil-shale raised	54,774 tons.
Value at mines	£41,489 6s.
Value per ton (at mines).....	15s. 1 79d.
Persons employed above-ground	76
Persons employed below-ground	148
	224

This shows an increase of 66 in the number of persons employed, and 31,912 tons in the output, as compared with 1900.

The value of the oil shale at the mines is 2s. 11d. per ton less than in 1900.

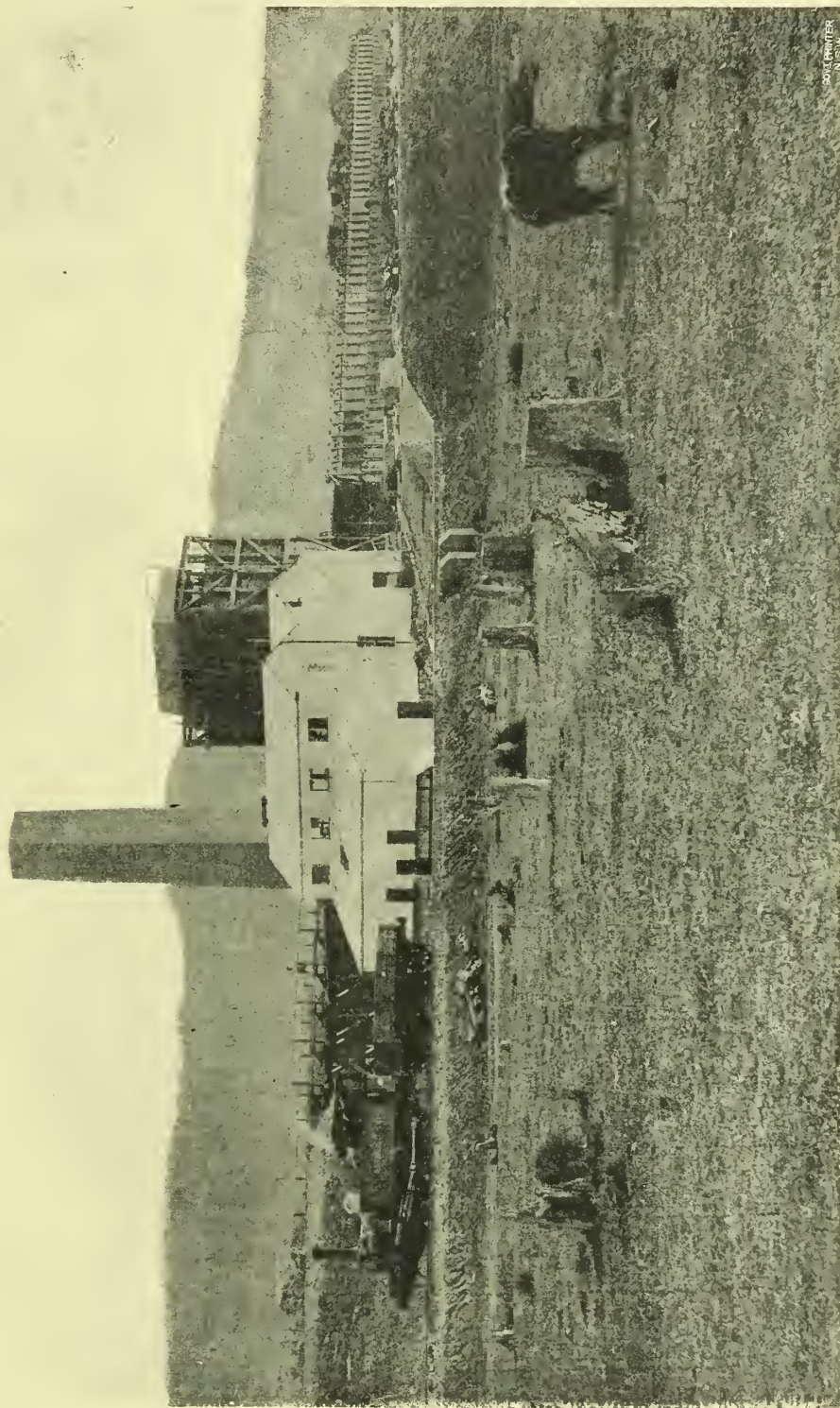
COKE RETURNS.

Districts.	Tons made.	Value (at ovens.)	Value per ton at ovens.
		£ s. d.	£ s. d.
Northern	35,939	37,841 0 6	1 1 0
Southern and Western	92,943	67,824 0 0	0 14 7
	128,882	105,665 0 6	0 16 4 76

This shows an increase of 2,669 tons as compared with the quantity of coke manufactured in 1900.

The average value is 11 63d. per ton less than in 1900.

During the latter half of the year, in consequence of the depressed condition of all smelting operations, owing to the reduced prices of metals, the coke trade has been much depressed, and as a result several of the ovens have been put out. Had this not been the case, doubtless the make of coke would have been much greater during the year.



COKE WORKS OF THE BROKEN HILL PROPRIETARY COMPANY, LIMITED, AT BELLAMBI.

SOLE PRINTERS
N.S.W.

The following table shows comparisons between the year under notice and the preceding year, as regards the proportion that the accidents and deaths bear to the persons employed, and the quantity and value of the coal for each person employed in and about the coal-mines in the Northern, Southern and South-western, and Western Districts :—

	Northern District.		Southern and South-western District.		Western District.	
	1900.	1901.	1900.	1901.	1900.	1901.
Number of persons employed in and about the mines	8,555	9,157	2,324	2,499	454	535
Number of persons employed underground	6,817	7,258	1,802	1,946	381	440
Quantity of coal raised in tons	3,925,684	3,999,252	1,265,055	1,544,454	315,858	424,720
Number of non-fatal accidents	126	133	46	59	7	11
Number of lives lost by accident	19	14	3	3	1	No life lost
Persons employed per each non-fatal accident	68	69	50	42	65	48
Persons employed per each life lost	450	654	775	833	454	No life lost
Tons of coal raised per each non-fatal accident.....	31,156	30,069	27,501	26,177	45,123	38,611
Tons of coal raised per each life lost.....	206,615	285,660	421,685	514,818	315,858	No life lost
Tons of coal raised per each person employed in and about the mines.	459	436	544	618	695	793
Tons of coal raised per each person employed underground.	576	551	702	793	829	965
Value of coal raised	£ s. d. 1,246,011 10 0	£ s. d. 1,669,519 2 9	£ s. d. 344,811 18 0	£ s. d. 407,195 17 6	£ s. d. 78,987 15 7	£ s. d. 102,214 4 6
Value of coal raised per each person employed in and about the mines.	145 12 11	182 6 5	148 7 4	162 18 9	171 19 11	191 1 1
Value of coal raised per each person employed underground.	182 15 7	230 0 5	191 6 11	209 4 11	204 19 1	232 6 1

DECENNIAL RETURN.—Port of Newcastle.—Foreign and Intercolonial Ports.

Year.	Vessels cleared outwards for Foreign and Intercolonial Ports.		Total value of Imports from Foreign and Intercolonial Ports.	Quantity and value of Coal exported to Foreign and Intercolonial Ports.		Total value of Exports (inclusive of Coal) to Foreign and Intercolonial Ports.	Total amount of Revenue collected.
	No. of Vessels.	Tonnage.		Tons.	Value.		
			£		£	£	£ s. d.
1892	1,307	1,381,318	765,083	1,894,735	879,482	1,846,953	191,394 12 10
1893	1,108	1,209,467	451,253	1,583,882	702,190	1,700,813	151,286 8 1
1894	1,255	1,415,159	427,581	1,891,674	710,341	1,485,475	158,895 12 11
1895 ..	1,207	1,410,004	420,778	1,920,378	678,217	1,417,122	155,362 8 1
1896	1,180	1,479,033	611,872	2,070,304	729,444	1,496,687	123,280 15 3
1897	1,375	1,740,345	510,721	2,431,489	842,347	1,746,925	112,548 14 2
1898	1,431	1,803,605	409,527	2,485,394	846,128	1,782,634	118,615 6 1
1899	1,273	1,707,108	622,563	2,478,397	882,857	1,598,825	111,129 7 11
1900	1,493	2,087,319	680,250	3,021,912	1,136,476	2,185,047	131,272 2 11
1901	1,550	2,216,068	857,782	3,104,735	1,528,121	2,507,306	149,454 2 3

RETURN showing the quantity raised, price per ton, and value of the Boghead Mineral or Oil-shale, from 1865 to 1901 inclusive.

Year.	Tons.	Average price per ton.	Value.	Year.	Tons.	Average price per ton.	Value.
		£ s. d.	£ s. d.			£ s. d.	£ s. d.
1865	570	4 2 5·47	2,350 0 0	1884.....	31,618	2 5 7·85	72,176 0 0
1866	2,770	2 18 10·48	8,154 0 0	1885.....	27,462	2 8 11·62	67,239 0 0
1867	4,079	3 14 9·21	15,249 0 0	1886.....	43,563	2 5 10·79	99,976 0 0
1868	16,952	2 17 7·11	48,816 0 0	1887.....	40,010	2 3 10·43	87,761 0 0
1869	7,500	2 10 0·00	18,750 0 0	1888.....	34,896	2 2 2·26	73,612 0 0
1870	8,580	3 4 3·18	27,570 0 0	1889.....	40,561	1 18 3·55	77,666 15 0
1871	14,700	2 6 3·91	34,050 0 0	1890.....	56,010	1 17 2·07	104,103 7 6
1872	11,040	2 11 11·91	28,700 0 0	1891.....	40,349	1 18 8·90	78,160 0 0
1873	17,850	2 16 6·55	50,475 0 0	1892.....	74,197	1 16 8·16	136,079 6 0
1874	12,100	2 5 1·48	27,300 0 0	1893.....	55,660	1 16 4·44	101,220 10 0
1875	6,197	2 10 2·22	15,500 0 0	1894.....	21,171	1 10 0·20	31,781 5 0
1876	15,998	3 0 0·00	47,994 0 0	1895.....	59,426	1 5 3·78	75,218 18 8
1877	18,963	2 9 0·82	46,524 10 0	1896.....	31,839	1 1 5·81	34,201 18 0
1878	24,371	2 6 11·49	57,211 0 0	1897.....	34,090	1 3 9·09	40,611 15 0
1879	32,519	2 1 10·96	66,930 10 0	1898.....	29,698	1 1 5·26	31,834 0 0
1880	19,201	2 6 7·03	44,724 15 0	1899.....	36,719	1 2 2·82	40,823 5 0
1881	27,894	1 9 2·59	40,748 0 0	1900.....	22,862	0 18 0·79	20,651 13 0
1882	48,065	1 15 0·00	84,114 0 0	1901.....	54,774	0 15 1·79	41,489 6 0
1883	49,250	1 16 10·77	90,861 10 0				

The following statistical return, furnished by the Customs Department, Newcastle, shows that the greatest increases in the export of coal from that port have been:—To Victoria, 43,244 tons; West Australia, 51,330 tons; New Zealand, 36,861 tons; United States, 56,767 tons; Philippine Islands, 34,042 tons. And that the greatest decreases in the export of coal from that port have been:—To Java, 54,735 tons; Chili, 39,040 tons; South Australia, 30,022.

COAL EXPORT.

NEWCASTLE, New South Wales.—Return showing quantity of Coal exported during the years 1900 and 1901 respectively.

Countries to which exported.	1900.	1901.	Increase.	Decrease.
	tons.	tons.	tons.	tons.
Victoria	760,937	804,181	43,244	.....
Queensland	45,035	33,190	.....	11,845
South Australia	506,570	476,548	.....	30,022
West Australia	160,956	215,286	54,330	.....
Tasmania	94,618	87,275	.....	7,343
New Zealand	205,315	242,176	36,861	.....
Hong Kong	14,750	9,050	.....	5,700
United States	148,597	205,364	56,767	.....
Java	137,954	83,219	.....	54,735
New Caledonia	20,298	20,573	275	.....
India	35,070	30,293	.....	4,777
Philippine Islands	72,374	106,416	34,042	.....
Fiji	12,961	18,311	5,350	.....
Mauritius	1,740	9,980	8,240	.....
Peru	61,031	47,912	.....	13,119
Chili	454,207	415,167	.....	39,040
Straits Settlements	46,090	36,257	.....	9,833
Sandwich Islands	171,159	168,869	.....	2,290
New Hebrides	1,000	2,250	1,250	.....
Ecuador	1,105	3,887	2,782	.....
Panama	17,234	7,394	.....	9,840
Mexico	16,634	17,320	686	.....
Celebes Islands	8,407	.....	.....	8,407
Great Britain	500	4,390	3,890	.....
New Guinea	1,642	2,320	678	.....
Cape Colony	7,286	8,176	890	.....
China	2,044	1,600	.....	444
Natal	8,921	25,199	16,278	.....
Molucca Islands	3,095	.....	.....	3,095
Siam	800	.....	.....	800
Samoa	650	.....	.....	650
Dutch East Indies	2,932	.....	.....	2,932
Ceylon .....	.....	3,200	3,200	.....
Canada .....	.....	6,500	6,500	.....
Gilbert Islands .....	.....	6,008	6,008	.....
New Britain .....	.....	2,550	2,550	.....
Nicaragua .....	.....	891	891	.....
South Sea Islands .....	.....	883	888	.....
Society Islands .....	.....	1,345	1,345	.....
Germany .....	.....	750	750	.....
Grand Total	3,021,912	3,104,735	287,695	204,872

NEWCASTLE.—Export of Coke for the year 1901.

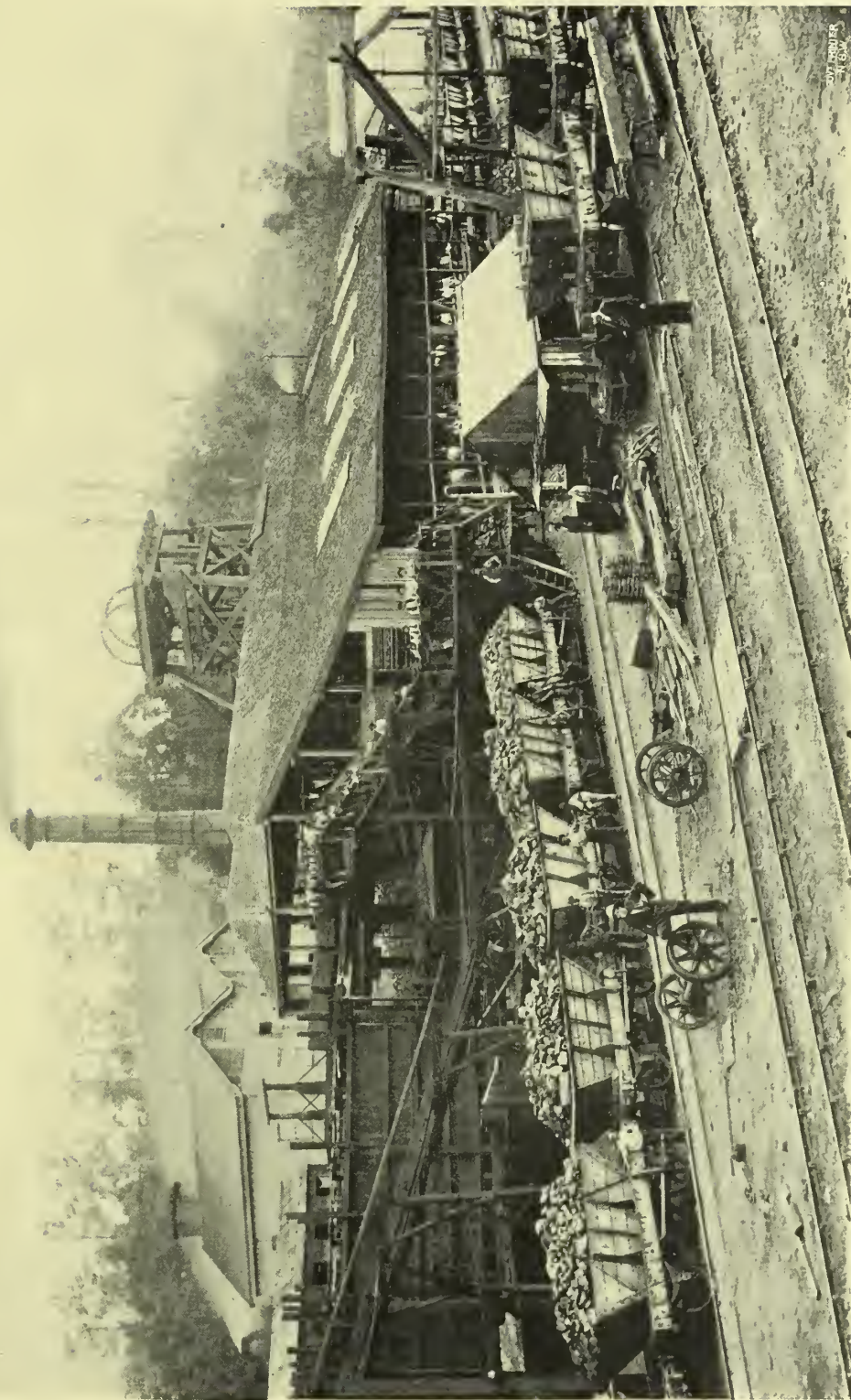
Countries to which exported.	Quantity.	Value.
	tons.	£
Tasmania	47	61
Victoria	1,896	2,725
South Australia	7,026	9,974
New Zealand	584	846
West Australia	580	899
Total	10,133	14,505

During the year 1900 the total quantity of coke exported from Newcastle amounted to 15,210 tons, valued at £20,877. This year shows a decrease of 5,077 tons and £6,372 value.

The following statements, kindly supplied by Mr. E. Potts, Customs Officer at Wollongong, show the shipments of coal and coke from the Port of Wollongong and jetties for the year 1901; also similar statements in regard to the Port of Sydney, supplied by the Customs Department.

SHIPMENTS of Coal coastwise from the Port of Wollongong for the year 1901.

Month.	Jetties.	Belmore Basin.	Total.
	tons.	tons.	tons.
January	38,052	16,640	54,692
February	44,390	17,062	61,452
March	22,025	11,257	33,282
April	30,394	16,581	46,975
May	43,494	17,893	61,392
June	31,750	16,850	48,600
July	34,380	20,596	54,976
August	37,869	19,143	57,012
September	37,888	18,857	56,745
October	40,725	17,239	57,964
November	42,316	16,011	58,327
December	39,652	17,739	57,391
	442,935	205,873	648,808



THE NEWCASTLE COAL MINING COMPANY'S A PIT MEREWETHER.

(Near view.)

OVERSEA shipments of coal and coke from the Port of Wollongong and Jetties during the year 1901.

Article.	Destination.	Quantity.	Value.	Article.	Destination.	Quantity.	Value.
Coal ...		Tons.	£	Coke ...		Tons.	£
	Victoria	125,355	47,690		Victoria	1,163	707
	South Australia	60,194	22,272		South Australia	17,425	11,575
	West Australia	43,071	15,938		West Australia	5,211	3,157
	Tasmania	9,978	3,705		Tasmania	20,587	12,305
	New Zealand	4,808	1,793		Queensland	4,032	3,030
	Queensland	4,440	1,656				
	Fiji	12,878	4,775				
	Hong Kong	8,269	3,068				
	New Hebrides	424	160				
	Shanghai (China)	5,170	1,943				
	Singapore	8,073	2,997				
	Total	282,660	105,997		Total	49,318	30,824

EXPORTS from Sydney of coal and coke, during the year 1901.

Article.	Destination.	Quantity.	Value.	Article.	Destination.	Quantity.	Value.
Coal ...		Tons.	£	Coke ...		Tons.	£
	Queensland	482	246		Queensland	287	337
	Victoria	6,900	3,510		Victoria	91	1,162
	Tasmania	114	62		Tasmania	12	28
	South Australia	3,540	1,982		South Australia	13,732	10,153
	West Australia	2,000	1,109		Hong Kong	14	15
	Caroline Islands	150	103		Japan	97	87
	Ceylon	5,008	2,654		Mauritius	57	67
	Chili	17,667	9,936		United States	3,135	2,144
	China	11,849	7,071				
	Hawaiian Islands	6,463	3,576				
	India	2,800	1,742				
	Japan	2	2				
	Kaiser Wilhelm's Land	70	54				
	Mauritius	418	244				
	Peru	1,716	1,047				
	Portuguese East Africa	1,268	792				
	South Sea Islands	1,419	818				
	Straits Settlements	9,890	5,590				
	United States	10,254	5,965				
	Hong Kong	1,500	1,125				
	Total	83,590	47,704		Total	18,235	13,993

SECTION III.

ACCIDENTS.

During the year 1901 there were 218 accidents reported, of which 15 were fatal, and 203 non-fatal.

The fatal accidents caused the deaths of 17 persons, and the non-fatal accidents caused injuries to 207 persons. The figures for 1901 disclose, therefore, the satisfactory decrease of 7 in the number of deaths, but unfortunately there are injuries to 14 more persons than in 1900.

All the accidents which have been reported are included in the lists of fatal and non-fatal which accompany this report. At the commencement of the year, when the Miners' Accident Relief Fund came into force, several non-fatal accidents were reported by managers which do not appear to come within the meaning of section 29 of the Coal Mines Regulation Act. All of them, however, are included in the list, although they unduly swell the total. Colliery managers were evidently of opinion that, whatever accident it was necessary to report for the purpose of the Miners' Accident Relief Fund, it was equally incumbent to report under the Coal Mines Regulation Act. There has always been considerable difficulty in determining what accidents should be reported within the meaning of the words "serious personal injury." This question has given rise to considerable discussion between inspectors and colliery managers in Great Britain. Where there is doubt on the manager's part it would, perhaps, be judicious to take the advice of the Colliery doctor.

The only accident which caused the death of more than one person was the unfortunate explosion of gas and coal-dust at Burwood Colliery on November 13th, when 3 workmen were killed and 6 others injured.

In addition to the above, the following accidents in or about mines were reported during the year. As they are not accidents within the terms of section 29 of the Coal Mines Regulation Act, they are not included in the list.

On the 15th February, an accident occurred on the Seaham and West Wallsend Colliery branch railway to a boy named Smith, 12 years of age (not an employee of either colliery.) He was riding on the buffer of a loaded coal wagon, and fell off with his arm across the rail. Result, arm almost severed.

On the 21st February, an accident happened to a youth named John Lloyd, aged 20, coal carter, not employed, at the Newcastle Coal Mining Company's B pit. At breakfast time he joined some of the mine employees in the railway hopper engine-room. He was sitting with his feet within the circulation-crank and, the engine being started, several toes were crushed.

On the 29th June, the death occurred at Wallsend of James Ford. The primary cause of death was supposed to be a piece of coal in the ear, which set up inflammation which extended to the brain.

On the 20th July, a miner, named William Henry Down, died at the Wallsend Colliery under the following circumstances:—After completing his day's work he returned to the surface with his mate, and whilst at the pick-rack he suddenly fell down, and on the arrival of a doctor was pronounced to be dead. An inquest was held, and a verdict returned that death was due to natural causes—to wit, failure of the heart due to Bright's disease of the kidneys.

SUMMARY of Fatal and Non-fatal Accidents, classified according to Place and Cause.

Place and Cause.	Fatal Accidents.		Non-fatal Accidents.	
	Number of separate fatal accidents.	Number of deaths.	Number of separate non-fatal accidents.	Number of persons injured, including those injured by accidents which proved fatal to their companions.
Explosions of fire-damp or coal-dust.....	1	3	3	6
Falls in mine :—				
Falls of side	2	2	56	56
Falls of roof	5	5	24	24
Total falls	7	7	80	80
Shaft accidents :—				
Overwinding .....	.....	.....	.....	.....
Ropes and chains breaking.....	.....	.....	.....	.....
Whilst ascending or descending by machinery .....	.....	.....	.....	.....
Falling into shaft from surface .....	.....	.....	.....	.....
Things falling into shaft from surface .....	.....	.....	.....	.....
Falling from part way down .....	.....	.....	.....	.....
Things falling from part way down .....	.....	.....	1	1
Miscellaneous .....	.....	.....	2	2
Total in shafts .....	.....	.....	3	3
Miscellaneous underground :—				
By explosives.....	.....	.....	9	10
Suffocation by natural gases .....	.....	.....	.....	.....
By underground fires	1	1	.....	.....
Eruptions of water .....	.....	.....	.....	.....
Haulage—				
On inclined and engine planes	2	2	5	5
By ropes and chains breaking .....	.....	.....	.....	.....
By trams and tubs	1	1	31	31
By machinery .....	.....	.....	.....	.....
Sundries.....	2	2	36	36
Total miscellaneous underground	6	6	81	82
On surface :—				
By machinery .....	.....	.....	6	6
Boiler explosions .....	.....	.....	.....	.....
On railways and tramways.....	1	1	9	9
Miscellaneous .....	.....	.....	21	21
Total on surface	1	1	36	36
Gross Total	15	17	293	297

LIST of Fatal Accidents.

Nc. of Accident.	Date of Accident, 1901.	Name of Mine.	Situation of Mine.	Name, Age, and Occupation of Person killed.	Cause of Accident and Remarks.
1	17 Jan...	Wallsend No. 1 ..	Wallsend	Robert Gray, 67, miner ..	Deceased was sitting on his left foot with the right leg extended, and was shovelling some coal back. A piece of little tops about 3 feet by 1 foot by 8 inches, fell away a distance of two feet; it broke in pieces as it fell, and a small piece struck Gray on right thigh, just above the knee, fracturing the femur. The accident occurred in a 4-yard bord—height under little tops 3 ft. 8 in. Just prior to the coal falling it had been sounded and was considered quite safe. Died on February 2nd, 1901.
2	30 ,,	Hetton	Carrington....	Thomas Clark, 23, wheeler.	Fatal injury by fall of roof. While going in with his empty set his horse knocked some timber out, letting down some roof stone. He was riding in the tub. Died on arrival at pit top. About four tons of Morgan stone fell upon Clark, his horse, and train of tubs. Prop about 2 feet from rail. Tram-road of long rail secured with fish plates. Verdict "Accidental death." No dependents left.
3	19 Feb...	Dudley.....	Redhead	George Callender, 15, wagon-shunter.	The duties of deceased were to let full wagons and trucks out from the screens when loaded, and lower them down line. He was engaged lowering out loaded D Trucks, and, owing to the brakes not being all on the same side, he passed round the truck front to lower the brakes. He had evidently done so with the first brake, and, as no one saw the actual accident, it is assumed that he slipped off the brake and fell between first and second trucks—the wheel of the latter fracturing his skull, etc. Death was instantaneous.
4	23 April..	South Bulli.....	Bellambi	A. C. Langenberg, 14, greaser.	Serious accident resulting fatally; crushed by a full tub on main road underground. No one witnessed the accident, but it is surmised that deceased in some way got foul of the wire-rope. He was taken to the hospital, and died from "shock" a few hours after.

No. of Accident.	Date of Accident, 1901.	Name of Mine.	Situation of Mine.	Name, Age, and Occupation of Person killed.	Cause of Accident and Remarks.
5	18 May..	Rugby	Curlewis	Samuel Pryor, 29, miner..	Engaged driving tunnel, proving coal seam. About 3½ chains of tunnel bratticed. The brattice cloth caught fire whilst he was alone at the face, and the result was that he was suffocated.
6	31 „	Metropolitan	Helensburgh ..	Arnold James Downes, 40, miner.	Serious accident which resulted fatally. Downes was in the act of passing a horse at the No. 2 Flat underground; there was only 18 inches of space between the horse's rump and a tub, and 4 feet at the horse's head, for Downes to pass through. He was carrying 2 picks in one hand, and a safety lamp in the other, and his "tucker" tins on his back. Whilst getting through the 18 inches of space, the horse crushed him against the tub. From the effects of the crush he died on June 4th.
7	26 June..	Co-operative	Plattsburgh ..	Samuel Dumbleton, 50, miner.	Fatally injured by fall of "back-end" coal over a sprag. Death ensued 14 hours afterwards, and, according to the doctor, was caused by intense shock following on rupture of lung and fractured pelvis. About 2 tons of coal in one piece fell upon him.
8	10 „ „	Newcastle Coal-mine Company's B Pit.	McCreweher ..	Farquhar Donald Campbell, 53, pumpman.	Caught by engine plane full set, and dragged by it for about 22 yards. Arm torn off, ribs broken, and injuries to head. Died seven hours afterwards. Deceased was on his way out by at the termination of his shift, 1.30 p.m. Left wife and twelve children. Refuge places were in order.
9	18 „ „	Bellambi	Bellambi	William Jack, 38, miner..	Back broken by a fall of stone (roof) at his working-place. The stone came away from between two slippery facings close to the face. The injured man died from the effects of injuries received, at Bulli Hospital, on 8th October. Coroner held an inquest, and the verdict returned by the jury was, "William Jack died from exhaustion from injuries accidentally received at Bellambi Mine, on 18th July last."
10	9 Aug...	Stockton	Stockton	George Proctor, 23, miner	Punctured wound on left foot by point of pick. It appeared he had continued to work on until the beginning of the next week, when tetanus set in, from which he expired on the 25th August.
11	16 Sept..	Wallsend No. 1 ..	Wallsend	David Forrest, 49, miner..	Engaged filling a tub, when a thin slab of roof shale fell suddenly out, striking him on back, injuring spine. Died from these injuries on 6th October, 1901.
12	16 Oct. ..	Stanford Merthyr	East Maitland..	Roland Alfred Smith, 27, miner.	Fatal injuries by being crushed between an empty set and the face whilst crossing the road at the bottom of the main tunnel. Inquest held, but jury, failing to agree, were discharged, and no verdict returned.
13	13 Nov...	Burwood	Redhead	John Molloy, 26, shiftman; William Patterson, 20, shiftman; John Champion, 28, shiftman.	Molloy was killed by force of explosion of gas and coal-dust. Patterson and Champion died from burns and shock received in explosion.
14	21 „ „	Stockton	Stockton	David Livingstone, 44, miner.	Deceased was in the act of drawing a sprag, when the coal following it away caused the sprag to fly and strike him on the chest, bursting both lungs and breaking some ribs. Death instantaneous. Verdict, "Accidental death."
15	31 Dec...	Brown's No. 2 ..	Minni	Francis Chalmers, 45 miner.	Fatal injuries to pelvis and ribs by fall of roof. Died, 1st January, 1902. At the inquest, held on 2nd January, the doctor said: "In my opinion, the cause of death was shock and the injuries received to the heart and lungs, the latter being punctured by the broken ribs."

The following tables show the districts in which the accidents occurred:—

FATAL ACCIDENTS.

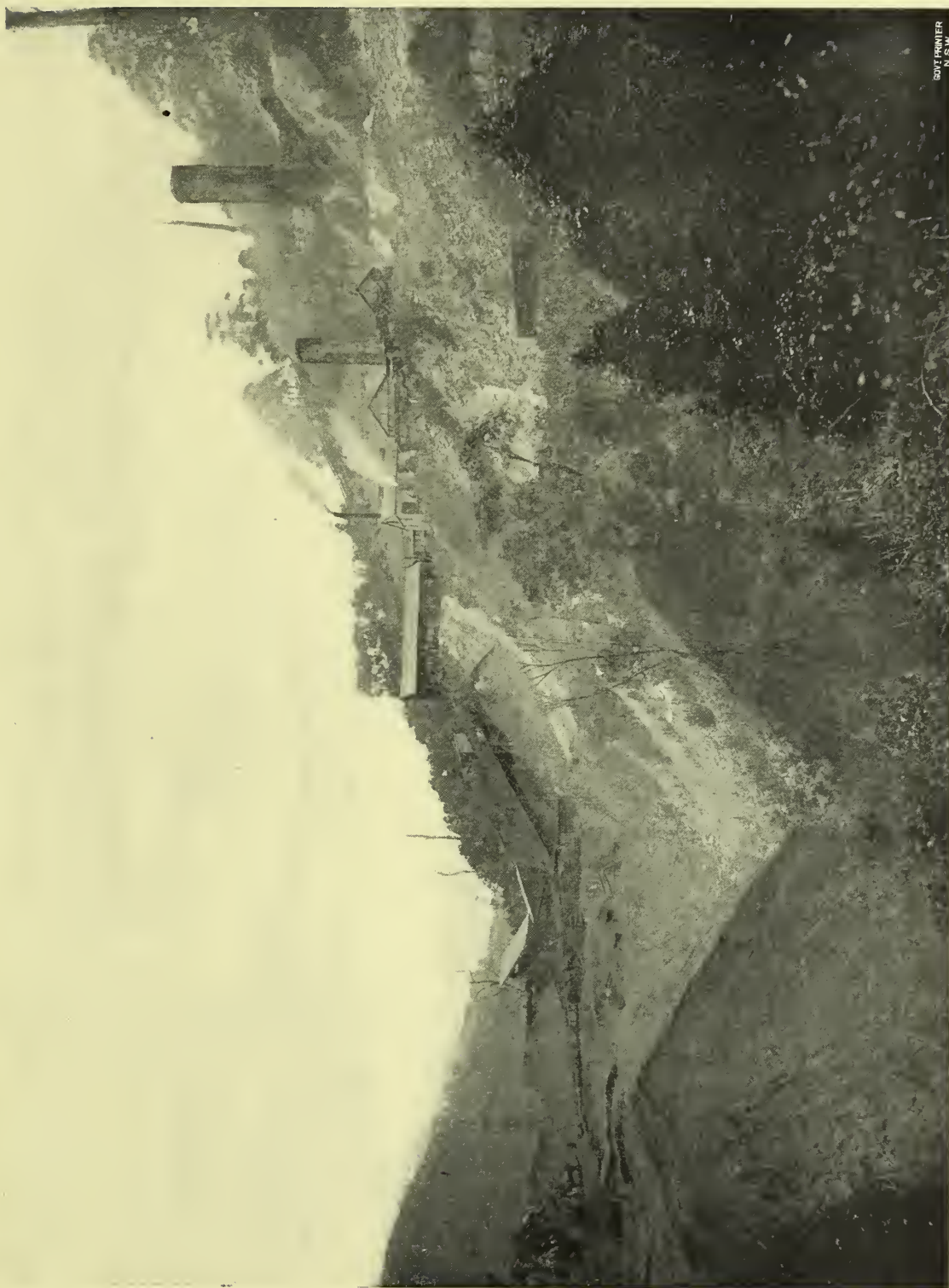
Districts.	Fatal Accidents.						Deaths.					
	Explosions of fire-damp and coal-dust.	Fall of roof and sides.	In shafts.	Miscellaneous underground.	On the surface.	Total.	Explosions of fire-damp and coal-dust.	Fall of roof and sides.	In shafts.	Miscellaneous underground.	On the surface.	Total.
Northern	1	6	...	4	1	12	3	6	...	4	1	14
Southern and South-western .....	...	1	...	2	...	3	...	1	...	2	...	3
Western .....	...	...	...	...	...	...	...	...	...	...	...	...
Totals, 1901.....	1	7	...	6	1	15	3	7	...	6	1	17
Totals, 1900.....	...	5	2	5	4	16	...	5	6	9	4	24

NON-FATAL ACCIDENTS.

Districts.	Non-fatal Accidents.						Number of persons injured, including those injured in accidents fatal to other persons.					
	Explosions of fire-damp and coal-dust.	Fall of roof and sides.	In shafts.	Miscellaneous underground.	On the surface.	Total.	Explosions of fire-damp and coal-dust.	Falls of roof and sides.	In shafts.	Miscellaneous underground.	On the surface.	Total.
Northern	3	54	1	51	24	133	6	54	1	51	24	136
Southern and South-western .....	...	23	1	25	10	59	...	23	1	26	10	60
Western .....	...	3	1	5	2	11	...	3	1	5	2	11
Totals, 1901.....	3	80	3	81	36	203	...	80	3	82	36	207
Totals, 1900.....	2	70	4	74	29	179	11	74	5	74	29	193

List of Non-fatal Accidents.

No. of Accident.	Date of Accident, 1901.	Name of Mine.	Situation of Mine.	Name and Occupation of Person injured.	Cause of Accident and Remarks.
1	3 Jan. . .	South Greta . . .	Farley	George Penfold, set-rider	Bruised one side and chest by empty set on engine bank whilst removing a prop set temporarily in roadway.
2	7 " " . .	Zig Zag	Lithgow	Benjamin Farnsworth, onsetter.	Coal fell off the tub whilst the cage was in motion. He received a deep cut on the arm.
3	7 " " . .	Mount Pleasant. .	Mount Pleasant	Wm. Donnelly, labourer. .	Finger hurt whilst wheeling barrow on surface. The barrow wheel went off the planks, and the hand of the barrow crushed one of his fingers. At work in a few days.
4	14 " " . .	" " " " " " . . .	" " " " " " . . .	Bernard Brennan, wheeler	Back strained whilst in the act of lifting a full tub on to the rails.
5	15 " " . .	Bulli " " " " " .	Bulli " " " " " .	Thomas Morris, miner . .	Foot hurt by coal falling from the face of his bord whilst he was in the act of taking the coal down.
6	15 " " . .	South Clifton . .	Clifton	John Burrows, miner . . .	Toe injured by piece of stone falling from the roof whilst he was making a place ready for a prop. At work in two days.
7	15 " " . .	Stockton	Stockton	Samuel Smith, miner . . .	Whilst in the act of cutting coal a piece of splint 4 feet square and 3 inches thick fell on his heel.
8	17 " " . .	" " " " " " . . .	" " " " " " . . .	Arthur Hobart, black-smith.	Injury to eye through a splinter of iron flying off the tool he was using.
9	17 " " . .	New Lambton . .	Adamstown . .	Walter Rodway, shiftman	At the time of accident he was employed wheeling. Whilst riding on tub it suddenly got off the road. The sudden stop threw him off, and likewise jerked the horse back on his (Rodway's) hips, and at the same time the loose coal off tub top struck him. His injuries were cut head and severe crush about lower portions of body, causing rupture; eighteen days off work.
10	17 " " . .	South Clifton . . .	Clifton	Stephen Meredith, wheeler	Finger bruised by a tub jumping off the rails underground.
11	18 " " . .	Waratah	Charlestown . .	Robert Whitehead, miner	Working in an 8-yard bord with tender shale roof which required slabbing every 2 feet 6 inches. Was struck on back of head and on shoulders by fall of the shale. He was not cut, but received rather severe blows.
12	19 " " . .	New Winning . . .	Newcastle . . .	Thomas Weir, miner . . .	Injury to hand by striking it against a tub whilst throwing a piece of "jerry" on to the goaf.
13	20 " " . .	Stockton	Stockton	Charles Morgan, stoneman	Injury to foot. A piece of shale fell while he was in the act of taking it down.
14	21 " " . .	Osborne-Wallsend	Mount Keira . .	Edward Anderson, miner	Thumb broken whilst lifting a piece of coal on to a tub.
15	21 " " . .	Wickham and Bullock Island.	Carrington . . .	William Halliday, wheeler	Was engaged pushing a full tub under low roof with his hands on top edge of tub. The coal caught the roof, and, jamming his finger, crushed the end of it. Not serious.
16	22 " " . .	A. A. Company's No. 2.	Hamilton	Edward Cook, shiftman. .	Fall of roof in a heading while he and another were making ready a pillar for the miners. Small toe cut off. Slab of stone 4 inches thick and about 12 square feet in area. It is thought that while shovelling, Cook undermined a prop supporting this stone.
17	23 " " . .	Hetton	Carrington . . .	Alfred Harris, miner . . .	Taking down top coal, when a small piece came away unexpectedly and struck him on the ankle.
18	23 " " . .	Browns'	Minni	James Jenkin, labourer . .	Fracture of wrist; slipped while descending screen steps.
19	24 " " . .	Burwood	Redhead	Kenneth Reid, miner . . .	He was in the act of taking out a sprag to get down afterwards portion of a prepared face of coal about 2 ft. 6 in. in depth. As soon as the sprag was eased a block 6 ft. by 3 ft. by 2 ft. 6 in. fell. The full tub was standing only 4 feet from the face, and Reid inadvertently stood between tub and face to get the sprag out, consequently he could not get back, and the coal striking him inflicted injuries to his hips and lower portions of body. Injuries not considered serious, as no bones broken, nor any internal injuries of consequence received.
20	26 " " . .	Vale of Clwydd . .	Lithgow	R. J. Blackford, miner . .	Slight abrasion of both legs by a piece of coal falling at his working place.
21	28 " " . .	" " " " " " . . .	" " " " " " . . .	James Osborne, miner . .	Leg slightly hurt by a piece of coal falling from the face of his working bord.
22	28 " " . .	Co-operative . . .	Plattsburg . . .	Thomas Hawkins, miner. .	Arm broken by being jammed between the end of a bar and the roof. A piece of coal caught and thus caused the bar to fly up.
23	29 " " . .	Mount Kembla . .	Kembla	Robert O'Hearn, miner . .	Head, foot, and shoulder bruised by a piece of coal falling at his working place; no bones broken.
24	1 Feb. . .	South Clifton . . .	Clifton	George Featonly, miner. .	Leg slightly bruised by a piece of coal falling at his working place.
25	2 " " . .	New Winning . . .	Newcastle . . .	Albert Snipe, wagon repairer's assistant.	Fracture of leg by chain at end of rope breaking whilst hauling waggons on to the pit-top.
26	4 " " . .	South Clifton . . .	Clifton	H. David, shiftman	Finger slightly hurt between a slab and a trolley. At work in two days.
27	4 " " . .	" " " " " " . . .	" " " " " " . . .	William Wright, ropeman	Fingers hurt whilst in the act of uncoupling a full tub.
28	4 " " . .	Zig Zag " " " " . .	Lithgow	William Mills, banksman. .	Arm slightly hurt while turning a winch. At work following day.
29	5 " " . .	South Clifton . . .	Clifton	George Hunter, shiftman	Leg broken and bruised about body. His leg got entangled by a chain at the bottom of shaft, and he was drawn some distance up shaft.
30	5 " " . .	Hetton	Carrington . . .	Edward Taylor, miner . .	Thumb broken by a piece of "penny" band stone, which fell whilst he was filling a tub.
31	5 " " . .	Wallarrah	Catherine Hill Bay.	William Fellow, onsetter	Attempting to get on to a train of waggons on branch railway, and got his fingers crushed. Little finger amputated, and two others severely lacerated.
32	6 " " . .	South Bulli	Bellambi	J. Fishwick, miner	Back injured. He was standing on a cask fixing a place for his drill; he fell into the cask and hurt the small of his back.
33	8 " " . .	New Winning . . .	Newcastle . . .	Henry James, coupler . .	Fracture of wrist while uncoupling loaded tubs at shaft bottom.
34	8 " " . .	South Greta	Farley	John Gibson, miner	Working at the face when a piece of coal flew out and struck him in the eye. Sight of one eye destroyed.
35	9 " " . .	Newcastle Co.'s A Pit.	Merewether . . .	Clement Benton, screen-boy.	While lowering empty tubs from pit top to store house, an empty tub, left behind, ran away, striking Benton, breaking his collarbone and injuring his head.
36	9 " " . .	Vale of Clwydd . .	Lithgow	P. Harper, miner	Back injured whilst filling a tub.
37	11 " " . .	Hetton	Carrington . . .	John Mitcheson, screen-boy.	Hand jammed by two pieces of coal whilst packing a waggon at screens.
38	11 " " . .	" " " " " " . . .	" " " " " " . . .	W. Smith, wheeler	Crushed between tub and wall side. Whilst trying to place tub on rails horse started.
39	12 " " . .	South Clifton . . .	Clifton	Richard Smith, shiftman	Foot injured by an empty trolley jumping off the road underground.
40	12 " " . .	Coal Cliff	" " " " " " . . .	D. H. Roberts, miner . . .	Hand injured. Whilst filling a tub his mate threw a shovelful of coal on his hand.
41	12 " " . .	Wallsend No. 1 . .	Wallsend	Edwin Maddison, miner. .	Turning away a pillar eight yards wide off the heading. Taking a piece of coal off left-hand end, near the roof, when a piece of stone 4 ft. by 1 ft. 6 in. by 10 in. fell suddenly away, and after striking the rail, caught his foot. Bad bruise and cut on instep.
42	15 " " . .	Wickham and Bullock Island.	Carrington . . .	John Elliott, miner	Injury to hip and leg by fall of "Morgan" roof, whilst reaching for coal to fill a tub.
43	16 " " . .	East Greta	East Greta . . .	Joseph Akers, miner . . .	Slight burns on left arm and chest by ignition of powder whilst unramming a missed shot. Breach of General Rule 12.
44	20 " " . .	Pacific	Teralba	Abram Rowley, miner . . .	Fracture of thigh by piece of coal falling off side whilst preparing to wedge.
45	20 " " . .	Waratah	Charlestown . .	John Burchell, miner . . .	Gas, given off from a blower in the face of a 12 ft. narrow bord, accumulated owing to brattice being deranged by an empty tub being left standing in the cloth doorway on heading, thus lessening supply of air in bord. The gas fired at naked light on cap of Burchell's mate, and the flame caught Burchell as he was getting on to the carch, burning his left shoulder slightly and singeing his hair.
46	20 Feb. . .	South Clifton . . .	Clifton	John Robson, miner	Toe injured whilst taking down a piece of coal. Returned to work following day.
47	20 " " . .	Osborne-Wallsend	Mount Keira . .	James Bell, miner	Foot badly cut with an axe whilst in the act of splitting a piece of round timber for a lid.
48	21 " " . .	Corrimal	Corrimal	J. Jordan, miner	Back injured by a small piece of stone falling from the roof at his working-place.
49	21 " " . .	Newcastle C. M. Co.'s B Pit	Merewether . . .	Willis Schofield, miner . .	Fell off carch, and struck buffer of a tub; two ribs broken.
50	21 " " . .	Brown's	Minni	William Buxton, screen-boy	Lowering empty wagons to screens, and attempted to sprag one of them, when he was partly drawn under the wheel, which passed over his foot. Bone of foot fractured.
51	22 " " . .	Lambton B.	Redhead	William Russell, miner . .	Tamped a charge of powder up in a hole 1 ft. 10 in. deep in a back end—left rib of a 6-yard bord. Length of fuse 2 feet. After lighting the fuse he took drills, &c., and placed them on the opposite side of the bord. He turned to retire to safety, but had stayed too long. The charge exploded and threw the coal (about a tub-full) across the bord, portion of the coal fractured his right leg below and above the ankle. Two props were also knocked out by the force.
52	23 " " . .	Seaham	West Wallsend	William Trenholm, boiler-attendant	Scalded on arms by hot water from water-heater, while packing valves at feed pump.
53	25 " " . .	Corrimal	Corrimal	William Herrington, screenman	Finger injured at the colliery screens by a piece of coal rolling on his hand.
54	25 " " . .	Metropolitan . . .	Helensburgh . .	T. Clarke, wheeler	Jawbone fractured by a kick from a horse underground.
55	26 " " . .	South Bulli	Bellambi	J. Hangard, miner	Foot injured by a piece of coal. Whilst Hangard was lifting a piece of coal on to the tub at his working-place it broke in two pieces and fell on his toes, breaking them.
56	26 " " . .	Stockton	Stockton	William Williams, miner	Fall of coal at the face fracturing leg below knee.
57	26 " " . .	Brown's No. 2 . . .	Minni	George Badcock, miner . .	Fall of coal breaking over sprag caused injury to hip joint.
58	27 " " . .	South Bulli	Bellambi	George Wilson, miner . . .	Foot slightly bruised by a piece of coal falling at the face of his bord.



GOVERNMENT
N.S.W.

THE MOUNT KEMBLA COLLIERY.

No. of Accident.	Date of Accident, 1901.	Name of Mine.	Situation of Mine.	Name and Occupation of Persons Injured.	Cause of Accident and Remarks.
59	1 March	Northern Extended	Teralba	Thomas Dumbleton, assistant wheeler	Bruised arm by buffers of tub, whilst attempting to couple them in a heading.
60	4 "	Wallsend No. 1 ..	Wallsend	Isaac Buxton, laborer ..	Engaged taking empty tubs from the "creepers" from tipplers on Heapstead. His foot got in between one of the spokes of creeper and the edge of flat sheet. The result was a badly lacerated heel.
61	4 "	Ebbw Vale	Adamstown ..	William Bone, wheeler ..	Sprained wrist, resulting from being caught with the two tubs. Pushing one out of a cut through he caught his wrist against another tub on road.
62	5 "	Northern Extended.	Teralba	John O'Neil, miner	Fracture of leg by piece of coal falling over a sprag at the face.
63	5 "	Bulli	Bulli	W. Marshall, miner	Foot injured by a stone falling at his working place from the roof.
64	7 "	Osborne-Wallsend	Mount Keira ..	R. Long, wheeler	Bruised about the ribs whilst leading his horse out of the mine.
65	11 "	"	"	D. Anderson, miner	Finger cut by a stone falling from the roof at his working place.
66	11 "	Zic Zag	Lithgow	W. Gallagher, miner ..	Finger injured whilst filling a tub; at work in two days.
67	11 "	Killingworth ..	Killingworth ..	David Jones, wheeler ..	Bringing two tubs out of a heading when horse swerved out of track at an old bord end. The tail chain broke and the tubs, which were spragged, ran a distance to where heading was between two pillar ends; not being able to get the horse past, he endeavoured to ease the sprags, with the result that his chest was squeezed between the tubs and rib on pillar end. No bones were broken, but a severe squeeze was received.
68	12 "	Co-operative ..	Plattsburgh ..	Charles Jarrett, miner ..	Injury to foot by a piece of stone falling from the roof, whilst he was preparing to set a prop.
69	13 "	Wickham and Bullock Island.	Carrington ..	John Walton, water bailer	Fracture of arm by falling on the flat sheets on the pit top, whilst proceeding to the cage for the purpose of descending the shaft.
70	15 "	New Winning ..	Newcastle	Edward Bennett, miner..	Severe flesh wound on right arm, caused by his mate accidentally striking him with a pick whilst holing.
71	16 "	Duckenfield ..	Minni	Patrick Slavin, miner ..	Drawing sprag from "back end," when a portion of the coal came away on him, causing fracture of collar-bone.
72	19 "	A. A. Co's. No. 2 Pit.	Hamilton	William Brien, miner	Flesh wound on right thigh and left hand; caused by slipping on a rail whilst passing round the end of a tub and falling with a pick in his hand.
73	19 "	Gunnedah	Gunnedah	Joseph Bennett, miner ..	Working in heading; a piece of roof shale fell from between two cutters, and striking his ankle caused a sprain thereof; not serious.
74	19 "	Wallsend No. 1 ..	Wallsend	John Forbes, miner	Standing up holing near right hand loose end of a pillar, 8 yards wide 4 ft. 9 in. high; a piece of coal, about 15 cwt. flaked off, and before he could spring clear, it caught his leg and broke it near the ankle, also injuring the latter.
75	20 "	Killingworth ..	West Wallsend.	John Hanley, screen-boy..	Foot crushed by wagon wheel. No bones apparently broken, but foot much crushed.
76	22 "	Lambton, B Pit..	Redhead	John Deane, miner	Preparing a charge for blasting in cut-through. He had one plug of powder in the hole and half a plug lying on some coal; he was testing the reliability of a piece of fuse by firing it, when the sparks therefrom ignited the half-plug, the result being burns on arms. Not serious; off work nine days.
77	23 "	South Clifton ..	Clifton	W. Henderson, miner	Cut his head against roof whilst walking on the main road underground.
78	25 "	Mount Pleasant ..	Mount Pleasant ..	John Thorne, wheeler	Two fingers broken whilst in the act of coupling on a tub at the flat. The horse started before he was ready, and jammed his hand between the couplings.
79	27 "	Co-operative ..	Plattsburgh ..	William Herd, horse-driver	A tub tipped over, and some of the falling coal broke his arm.
80	28 "	Stockton	Stockton	George Richardson, wheeler.	Compound fracture of leg below thigh through being crushed between tubs.
81	28 "	West Wallsend ..	West Wallsend.	John Hoskins, pick sharpener.	Kidding on buffers between first and second tub, when the former got off the way. Legs scalded by hot water from heater.
82	2 April	Hetton	Carrington	Job Eason, wheeler	Two fingers bruised through a slab falling on them. Tub going round turn knocked prop out, which allowed slab to fall.
83	2 "	Metropolitan ..	Helensburgh ..	A. J. Booth, onsetter	Injury to right foot; cut by the descending cage at bottom of shaft.
84	3 "	Bellambi	Bellambi	W. Harsly, wheeler and set-rider.	Leg slightly hurt by being jammed between the buffers of two tubs underground.
85	9 "	Bulli	Bulli	John Thompson, miner ..	Slight bruise on side, caused by a small piece of stone falling from roof at his working place.
86	9 "	Hetton	Carrington	David Hamilton, miner ..	Little-top coal fell away over the sprags, and hit him on the back and hip. Fracture of pelvis.
87	10 "	Mount Kembla ..	Mount Kembla ..	James Rich, miner	Hand cut by his mate accidentally striking him on the hand with point of pick, whilst holing at his working place.
88	12 "	Wickham and Bullock Island.	Carrington	John Whitby, miner	Fracture of thigh by piece of coal falling away from face between sprags.
89	13 "	Maryland	Plattsburgh ..	William Burt, driver	Arm broken by being jammed between two empty tubs.
90	19 "	Dudley	Dudley	John McLean, miner	Severe crushing of left foot by fall of coal whilst taking out a sprag.
91	23 "	Rhondda	Teralba	Hardy Hope, bricklayer..	Fell from building scaffold and broke his leg.
92	23 "	Wallsend No. 1 ..	Wallsend	John Meiklejohn, water-bailer.	Sitting on limbers driving horse attached to two tubs of water. Horse swerved, knocking out timber. About 54 square feet of stone (22 cwt.) fell away, and Meiklejohn, having his right arm on top of tub, received a severe bruising, and was pinned by the arm for some time by the weight of stone. Arm bruised from wrist to elbow. No other injury.
93	24 "	Stockton	Stockton	Joseph Proctor, miner ..	Fall of coal, finger fractured, small scalp wound, and contusion to body.
94	24 "	Corriamal	Corriamal	George Cram, miner	His mate accidentally struck him on the hand with the point of his pick, giving him a nasty cut.
95	26 "	"	"	John Barmise, miner	He stumbled and fell on the travelling-road underground, and the point of the pick he was carrying lacerated his hand.
96	29 "	Bulli Pass	Bulli	Robert Lewis, miner	Finger cut whilst in the act of lifting a piece of coal into a tub at his working place.
97	29 "	Newcastle Coal Mining Co's B Pit.	Merewether ..	Richard Bellamy, miner..	Working down some coal, when a quantity came away unexpectedly, breaking his right leg.
98	30 "	Brown's No. 4 ..	Minni	William Muir, trapper ..	Leg broken in three places below the knee. Fell asieep at his post with his leg across the rail. A set of nine tubs came along and knocked open the door which inflicted the injury.
99	13 May..	Coal Cliff	Clifton	John Daly, miner	Leg slightly hurt by piece of coal falling at his working place. He was able to walk home, a distance of 2 miles.
100	15 "	Northumberland.	Fassifern	John Rice, assistant-wheeler.	Severe injury to right leg (afterwards amputated), by slipping and being dragged by loaded tubs on a surface tramway.
101	16 "	Waratah	Charlestown ..	William Warren, miner ..	Approaching within 15 yards of a fault, the coal consequently tenderer than usual. Warren was holing towards right hand side, when a piece of coal, which had one sprag up, broke suddenly away from face in two pieces, one piece (about 20 cwt.) striking him, breaking right leg (simple fracture), bruising hip, wounding muscle of arm; also cuts on head. The coal that fell away was crescent-shaped.
102	22 "	Hetton	Carrington	Walter Blackie, driver ..	His horse got its feet entangled in its tail-chain and fell, striking the boy on the knee.
103	23 "	"	"	William Lloyd, miner	A piece of coal he was pulling down came away, and jammed his knee against the buffer of the tub. Thigh broken.
104	30 "	East Greta	East Greta	Thomas Wm. Burke, screeman.	Injury to head by falling off a waggon at the screen of No. 2 tunnel whilst loading the waggon.
105	3 June..	South Greta	Farley	Thomas Markham, miner..	Injury to eye by piece of coal flying off and striking him on the eye. Injury serious and probably the sight will be lost.
106	4 "	Burwood	Redhead	Adam Tripney, miner	Holing a back end when piece of coal from band, 3 ft. 6 in. from floor, fell away from greyback, knocking Tripney against sprag. Collar-bone broken.
107	4 "	Gunnedah	Gunnedah	Alexander Belford, shift-man.	Going into tunnel to attend his work, when he slipped on rail and injured knee-cap.
108	5 "	Wallsend No. 1 ..	Wallsend	William Hepple, miner ..	Hearing some runaway tubs coming towards him as he was going out-by on wheeling road, at back of engine flat, and mistaking them for empty ones on opposite road, he took refuge behind full tubs standing stationary. The crash caused an accident to him, whereby left arm was broken (compound fracture). Refuge hole was close to him.
109	6 "	New Lambton ..	Adamstown ..	James Wilson, wheeler ..	Whilst trying to stop his horse, was knocked down and bumped by the empty tub. Only lost four days, including Sunday.
110	6 "	Hetton	Carrington	Thomas Lindsay, driver..	Riding on limbers in front of full set, when first tub ended up, and jammed him, injuring him about the ribs. Severe internal injury.
111	11 "	Pacific	Teralba	John Davidson, wheeler..	Injury to the eye by being struck with a portion of the harness whilst wheeling, the horse giving a plunge and breaking the harness.
112	13 "	Wallsend No. 1 ..	Wallsend	David John Scott, labourer	Engaged lowering out full waggons and coupling same together; whilst so doing got his foot fast in railway crossing, and the first wheel of last waggon crushed his right foot; amputated above ankle.
113	13 "	Hetton	Carrington	John Jones, miner	Injury to leg by fall of coal, which fell away after a shot had been fired. In falling, it knocked Jones down and injured the ankle joint.
114	14 "	Dudley	Dudley	Thomas Farker, miner ..	Fractured collar-bone by fall of coal.
115	19 "	New Winning	Newcastle	John Mitchell, miner	Fracture of arm by falling off cask whilst cutting top-coal.
116	19 "	New Lambton ..	Adamstown ..	James Curry, miner	Holing a facing of coal with a loose end, no sprags up, portion fell away—about half a ton—and struck Curry, breaking two ribs, dislocating hip, and slightly squeezing him internally.

No. of Accident.	Date of Accident, 1901.	Name of Mine.	Situation of Mine.	Name and Occupation of Person Injured.	Cause of Accident and Remarks.
117	19 June..	Stockton	Stockton	Harold Gunderson, assistant sawyer.	Had the thumb of his left hand caught by the saw and nearly severed.
118	19 " "	Osborne, Wallsend.	Mount Keira ..	William Organ, labourer..	Knoeked down by a gust of wind between the full and empty road, near the screens, and slightly hurt his hip-bone. Returned to work in a few days.
119	20 " "	Gunnedah	Gunnedah	Alfred Rowlands, blacksmith.	Handling tub-plate of surface weighbridge, left his fingers under, with the result that one was broken and two bruised.
120	22 " "	Burwood	Redhead	Henry Wright, miner	Foot injured by piece of coal striking it whilst in the act of wedging said coal down.
121	24 " "	Irondale	Piper's Flat	John James, miner	Had his finger bruised while in act of turning an empty tub on a flat sheet underground. Tub bumped against a prop and jammed his finger.
122	25 " "	South Clifton....	Clifton	James Green, miner	Slightly bruised about the back by a piece of coal falling at his working place. Green was in the act of taking the coal down when it fell.
123	26 " "	Wallsend	Wallsend	William Hughes, miner ..	Whilst in a stooping position, shovelling coal into a tub, a flake of stone fell from roof, gashing his head and inflicting compound fracture of leg just above ankle.
124	1 July..	Bellambi	Bellambi	Joseph Fowler, coupler-on	Small bone of his arm broken whilst pushing two empty tubs at the entrance of the tunnel above ground; the two tubs bumped against each other, and his arm was broken.
125	1 " "	Katoomba	Katoomba	Thomas Austin, wheeler..	Had his leg slightly cut whilst in the act of stepping off a full tub underground. He returned to his work in a few days.
126	1 " "	Pacific	Teralba	William Varlett, wheeler..	Whilst wheeling down a bord, where it is necessary to use sprags in the wheels, he delayed too long in putting them in, and, in running alongside attempting to put in the sprags, he accidentally struck his head against a prop, and, in falling, was caught by the passing tubs. He received slight injury to his head and a bruise on his side.
127	4 " "	Newcastle C. M. Co.'s A pit.	Merewether ..	Bertie Victor, wheeler....	Right hip dislocated. Dropped his hat with light attached when in front of horse and three full tubs; while trying to recover it, he was caught and jammed between tubs and prop.
128	12 " "	South Bulli	Bellambi	Henry Kelly, miner	Had his ankle sprained and a slight scalp wound, caused by a fall of coal at his working place. The coal fell away from between two sprags.
129	15 " "	Katoomba	Katoomba	James McCloskey, miner..	Had his ankle slightly bruised by a fall of stone from the roof at his working place.
130	19 " "	Duckenfield	Minmi	Thomas Banfield, screen-boy.	Thrown from horse which he was bringing from the stables to the colliery adit, and received fracture of forearm.
131	23 " "	South Greta	Farley	Daniel Beatson, engine-driver.	Whilst kneeling on a boiler screwing up a bolt, the spanner slipped and he fell off the boiler on to the ground, receiving a severe shaking.
132	30 " "	Brown's No. 4 ..	Minmi	George Barr, shiftman ..	Accidentally passed light under powder tin, containing two pieces of cartridge of about quarter plug each, and ignited them, causing slight burns to right arm and right breast. Barr, with lamp on his head, was reaching to get his clothes, and his lamp came in contact with base of tin. Said tin was hanging on a prop.
133	3 Aug..	Collins'	Exeter	George Hancock, miner..	Collar-bone broken by a fall of coal at his working place.
134	5 " "	Bulli	Bulli	Charles Schmidt, screen-man.	Had three of his fingers broken at the screens.
135	5 " "	Wallsend	Wallsend	Martin Keough, miner ..	Holing a back-end of coal face with a parting from roof, also a good slippery facing, no sprag set of any kind. About 11 cwt. of coal fell away suddenly, causing compound fracture of right leg. Leg amputated.
136	6 " "	Wickham and Bullock Island.	Carrington	Henry Simpson, miner ..	A shot was prepared and lit, when Simpson and his mate retired. Hearing a report they assumed their shot had gone off, and went back into the bord, when their own shot exploded, and Simpson was struck on the leg with some of the falling coal; injuries are not serious.
137	6 " "	Rhondda	Teralba	David Barnett, miner	Crushed foot by fall of face coal. Piece fell while he was taking out a "tack."
138	7 " "	Hetton	Carrington	John Marsh, driver	Thigh broken by being jammed between two empty tubs, which were run into by a runaway horse. Hearing the horse coming the boy got in between the tubs to avoid being run over. Horse was addicted to kicking when unhooked.
139	7 " "	Bellambi	Bellambi	Michael Grace, miner	One toe broken by a fall of coal at his working place.
140	7 " "	New Lambton ..	Adamstown	John Wilson, miner	Standing up holing coal near roof when piece of coal-shale fell out from a slip and grazed his head and shoulder.
141	8 " "	South Clifton....	Clifton	James Woods, wheeler ..	Leg bruised by the endless rope underground.
142	10 " "	Bulli	Bulli	Charles Hegarty, miner ..	Leg fractured by a fall of coal at his working place.
143	12 " "	East Greta	West Maitland.	Roland Rose, miner	Whilst setting a sprag, a piece of coal fell from the face, and rolling down the steep floor struck Rose, fracturing his right thigh.
144	15 " "	Stockton	Stockton	Richard Griffiths, miner..	Fall of roof coal which injured the shoulder and abdomen.
145	16 " "	Newcastle Coal Mining Co.'s B Pit.	Merewether ..	George Schneider, wheeler.	Nose broken by kick from horse.
146	20 " "	Newcastle Coal Mining Co.'s A Pit.	"	Edward Stallard, shiftman	Two broken ribs by falling against the end of a large prop lying on the floor.
147	22 " "	Elemore Vale....	Wallsend	John Lewis, Main-road driver.	When leaving a flat with his horse and four full tubs, the horse turned out, and Lewis, who was sitting on the limbers, was squeezed between the limbers and a prop set between the two roads on the flat. The injuries are not serious.
148	23 " "	Wallsend No. 1 ..	"	Robert Brown, miner	Injury to eye by a piece of coal striking him; not serious.
149	23 " "	Northern Extended.	Teralba	Hugh Smith, wheeler	Whilst putting a sprag in a tub, the tub left the rails and Smith's finger was jammed between the sprag and a sleeper. Injuries not of a serious nature.
150	2 Sept..	Wallarah	Catherine Hill Bay.	Henry Fox, carpenter	A chain, carrying lifting block, broke, causing Fox to fall heavily, breaking his shoulder blade, and inflicting severe injuries to the head. Two blocks attached by separate 2-inch chains were lifting about 3 tons.
151	3 " "	Hetton	Carrington	George Oaks, miner	A piece of the 4-inch coal (near the roof) fell and hit his foot.
152	5 " "	Stockton	Stockton	Martin Fitzgibbon, wheeler.	Injuries to shoulder, jammed between tub and prop. First of three full tubs overturned at a turn and jammed him against a prop.
153	6 " "	Newcastle Coal Mining Co.'s A Pit.	Merewether ..	George Watts, miner	A piece of coal flew from pick point and struck his eye. Eye subsequently taken out.
154	7 " "	South Bulli	Bellambi	Joseph Murphy, clip-boy	Three fingers hurt by the wheel of a full tub, near to the screens, passing over his hand.
155	9 " "	Osborne, Wallsend.	Mount Keira ..	William Timms, wheeler..	Hip injured by a full tub, going round a turn underground, pushing him against a prop.
156	11 " "	Bulli	Bulli	Walter Woodlett, miner ..	Had his leg bruised by a piece of coal falling at his working place. He was in the act of taking down the coal when it fell.
157	13 " "	Metropolitan	Helensburgh ..	William Davis, miner	Leg broken by a fall of roof-stone at his working place. He was in the act of knocking out a prop from under the stone when it fell.
158	16 " "	Wallsend No. 1 ..	Wallsend	William Clement, flatter	Whilst detaching the tail rope hook from the moving set on Engine Flat he slipped and fell in front of tub. Two passed over him, and the third jammed him lengthwise between rails. Bruised on body, and leg lacerated.
159	16 " "	"	"	William Rae, wagon-painter.	Removing pawl of winch with one hand, when the handle of winch slipped from his other. Handle flew round, striking and fracturing radius or outer forearm.
160	17 " "	Brown's No. 4 ..	Minmi	Thomas Rees, miner	Fall of stone causing fracture of shoulder blade. Dimensions of stone, 3 ft. x 3½ ft. x 8 in.
161	23 " "	Oakey Park	Lithgow	W. Gray, labourer	Slightly hurt by a tub on the surface incline.
162	27 " "	Duckenfield	Minmi	William Lewis, miner	Fall of stone while drawing down coal from the face, dislocating hip, and slightly injuring his hip. (Stone 4 ft. x 2 ft. x ½ ft.)
163	28 " "	Newcastle Coal Mining Co.'s B Pit.	Merewether ..	William Park, deputy	While laying a turn a piece of stone fell from between two sets of timber, breaking a rib.
164	8 Oct..	Newcastle Coal Mining Co.'s A Pit.	"	Robert Waugh, wheeler ..	While hooking limbers on to tub the horse turned, catching his finger between tub and shackle and crushing the bone.
165	9 " "	Brown's, No. 4 ..	Minmi	Henry Smith, miner	An empty cask happened to be placed top downward over where a slight blower of gas existed in the floor, about 5 yards from face. On turning the cask over to fill it with water the gas, which had collected in it, was ignited by the flame of the lamp which he carried on his head, and caused slight injury to left cheek. At work on the following day.
166	11 " "	Seaham	West Wallsend.	James Dawson, fitter	Arms slightly scalded while endeavouring to plug a defective boiler tube.
167	11 " "	Rhondda	Teralba	Duncan Andersen, miner	Fall of coal. Injury to face, cut and bruised head and back; injury to right foot. About 10 cwt. of coal fell.
168	14 " "	Wickham and Bullock Island.	Carrington	John Gardner, onsetter ..	Injury to right foot by cage, whilst taking out an empty tub.
169	14 " "	Northern Extended.	Teralba	Robert Stewart, miner ..	Injury to foot and abrasions on the back and head by fall of coal from the face.
170	14 " "	Bellambi	Bellambi	James Welsh, clipper	Finger cut off by the wheel of a full tub on the surface near to the screens. was in the act of uncoupling and fell. His hand went on the rail and the wheel passed over his finger.
171	15 " "	Bulli	Bulli	David Gresham, miner ..	Arm broken by a piece of coal falling at his working place.
172	15 " "	Hetton	Carrington	Andrew Wilson, miner ..	Fall of stone. A piece of Morgan stone fell on his back while he was preparing to set a prop.

No. of Accident.	Date of Accident, 1900.	Name of Mine.	Situation of Mine.	Name and Occupation of Person Injured.	Cause of Accident and Remarks.
173	15 Oct.,	Hetton	Carrington	Thomas Coaling, shift-man (timber cutter).	He was near the working face when a "backend" of coal fell, knocking out a prop, which, in falling, struck him on the head.
174	16 ,,	Seaham	West Wallsend ..	Edwin Stafford, miner ..	Ignition of gas. A small blower of gas ignited in the floor of the heading, about 4 yards from bord face, which, Stafford states, singed his arm. He was at work next day. At an inspection made soon afterwards there was no sign of gas coming from any part of floor.
175	19 ,,	Corrimal	Corrimal	Peter Johnson, miner	Eye injured. While tamping a hole at his working place the point of the pick pierced the corner of his eye.
176	22 ,,	South Bulli.....	Bellambi	Ambrose Cartwright, tub runner.	Arm broken by a full tub near to the screens. He was in the act of pushing a full tub on to the weigh-bridge when another tub bumped him on the arm.
177	22 ,,	Gunnedah	Gunnedah	Henry Newall, miner	Engaged dressing roof into face preparatory to wedging a quantity of coal down. The mass suddenly fell away and portion striking his left leg broke it. Compound and comminuted fracture of both bones.
178	24 ,,	Irondale	Piper's Flat ..	Reuben Yates, miner	Fingers bruised between top edge of tub and the roof, whilst wheeling. Only off work two days.
179	28 ,,	Burwood	Redhead ..	Leslie Wollons, miner....	Knocked out a sprag to get some coal down, when the mass suddenly fell, and owing to the tub being only 3 feet from the face, he was unable to get clear. He was jammed by the coal against a prop and the tub. Severe internal bruising, chest and abdomen; also external, on buttock.
180	5 Nov.,	Hetton	Carrington ..	Martin Henderson, miner.	Injury to back by fall of coal. While cutting the bottom coal, which had been fractured by a shot, a portion of it fell and knocked out a prop securing the overhanging little-tops coal, a piece of which, on falling, hit Henderson on the head and back.
181	6 ,,	A.A. Co.'s New Winning.	Newcastle ..	Joseph Acton, miner	Injury to foot by fall of coal from the face whilst standing up holing.
182	7 ,,	Burwood	Redhead ..	William Moore, miner....	Engaged pulling over loose coal at the face, and, whilst springing backward from the falling coal, received injury to the back by striking against the corner of a tub.
183	8 ,,	Co-operative ..	Plattsburg ..	William Embleton, miner	While holing in a wall in pillar working, a piece of coal fell over a sprag. In his efforts to free himself from the coal, which fell upon but did not hurt him, he struck the floor with his right shoulder, injuring the muscles. Injury not serious.
184	9 ,,	Wallsend, No. 1.	Wallsend	Thomas Whitehead, miner	Holing a back end of coal, which was spragged under open end. The apparently fast end fell from a grey back, and, throwing over the sprag, injured his hip, thigh, and knee.
185	11 ,,	Bulli Pass	Bulli ..	William Loyeday, miner..	One toe bruised by a fall of coal at his working place.
186	12 ,,	Bulli	" ..	Andrew Spawart, miner..	Arm broken by a fall of coal at his working place. He was in the act of taking the coal down, when it suddenly fell, and before he could clear himself rolled over and struck a prop. The prop was knocked out, and fell on his arm.
187	12 ,,	Wallsend, No. 1.	Wallsend	Thos. Ethirington, wheeler	Whilst between derailed empty tubs, in the act of lifting same on the road, the horse started away, and caused the wheeler to get jammed, injuring the left lower portion of his abdomen. Off about eight days.
188	13 ,,	South Greta	Farley	Samuel Galloway Dunn, miner.	Slight burns on the head by ignition of powder whilst retiring from firing a shot with superfluous cartridge.
189	14 ,,	Northern Extended.	Teralba	William Miles, miner	Burns on hand and arm by ignition of powder whilst proceeding to charge a shot.
190	23 ,,	Wallsend	Wallsend	Arthur Ashman, shiftman	Engaged wheeling. Whilst the horse was backing a full tub towards another full tub, Ashman got his fingers between the bumpers; one finger end cut off and two others severely jammed.
191	26 ,,	Anvil Creek	Greta	S. Parker, miner	Whilst walking outover in his bord to partake of dinner, a piece of roof stone fell, and bounding off floor hurt his leg.—Not serious.
192	26 ,,	Mount Kembla ..	Mount Kembla.	Harold Biggers, miner; James Biggers, miner.	Whilst Harold was in the act of lighting a shot in the bord, it exploded; some coal was dislodged, and striking him caused a fracture of the jaw. His brother James, who was standing behind him, received a severe cut on the head by a fragment of coal blown from the shot.
193	26 ,,	West Wallsend ..	West Wallsend.	Thomas Llewellyn, onsetter	A piece of coal fell down the shaft striking him on the back.
194	29 ,,	Corrimal	Corrimal	William Greer, clipper ..	Whilst in the act of fastening a clip on the rope, the tub left the rails, and as he was riding on the rope, he was thrown down and fell with his leg under the rope. The leg is fractured above the ankle.
195	30 ,,	Bellambi	Bellambi	Roger Heard, miner	While in the act of pulling down some "tops" he slipped and fell, and a piece of coal rolled over on to his leg, fracturing it.
196	30 ,,	Coal Cliff	Clifton	Robert Lord, blacksmith.	Injury to right arm by revolving handle of crab winch on the jetty.
197	4 Dec.,	Brown's No. 4 ..	Minmi	Charles Robertson, wheeler.	Fractured leg below the knee. Caused by riding on front of empty tub, when he fell off and the first tub passed over his leg. Tub derailed by some obstruction.
198	6 ,,	Killingworth	Killingworth ..	Thos. Collins, miner	Left hand burnt by an explosion of powder, supposed to have been accidentally dropped in charging the hole, and afterwards ignited by sparks emitted from fuse, when the shot firer was lighting the shot. Collins was sitting a few feet away from the shot-firer, who was at mouth of hole, which was a few inches from the floor.
199	10 ,,	Waratah	Charlestown ..	Joseph Halliday, miner ..	Whilst trimming the roof to liberate a hanging shot of coal, the latter fell suddenly away. He fell, and a piece of coal struck his thigh, and injured his right ribs.
200	12 ,,	Brown's No. 2 ..	Minmi ..	Thomas Murphy, miner..	Skin stripped off front of one of his legs by a piece of coal he was taking down rolling over on his leg.
201	16 ,,	Osborne Wallsend	Mount Keira ..	Thomas Clowry, Locomotive brakesman.	Severe injury to foot by being run over by Loco., whilst attempting to jump on the step during shunting operations.
202	30 ,,	South Clifton....	Clifton	Henry Anderson, blacksmith.	Injury to arm by revolving handle of drilling machine in fitting shop.
203	30 ,,	Wickham and Bullock Island	Carrington	Henry Lerve, miner	Holing under a portion of jerry without sprags, when a slab of jerry and part of bottom coal came suddenly away, injuring his back and squeezing him internally.

The following table shows the death-rate from accidents in the Coal and Shale mines of the State for the years 1900 and 1901:—

DEATH-RATE from Accidents in the State.

Year.	Per 1,000 persons employed below ground.	Per 1,000 persons employed above ground.	Per 1,000 persons employed below and above ground.
1901	1·633	0·381	1·369
1900	2·196	1·676	2·088

In the above table the figures for 1901 show better results than in 1900.

The following table shows a comparison of the death-rate, &c., in respect of Coal and Shale mines in the State for the years 1900 and 1901, and those in Great Britain and Ireland for the years 1899 and 1900 (including the persons employed on private branch railways, &c., and accidents to such persons):—

Place.	Death-rate from Accidents per 1,000 persons employed.	Number of persons employed per Fatal Accident.	Number of persons employed per Life Lost.	Tons of mineral raised per Fatal Accident.	Tons of mineral raised per Life Lost.
New South Wales, 1901	1·369	827	730	401,546	354,305
" " 1900	2·088	718	479	345,447	230,431
Great Britain, 1900	1·297	810	770	247,704	235,165
" " 1899	1·256	839	795	268,800	254,715

The statistics of New South Wales for the years quoted compare favourably with those of Great Britain for 1899–1900.

Of the three tables which follow giving particulars for the twenty years, ending with 1900, two afford comparisons as between Great Britain and Ireland and this State, and the third shows the fatal accidents here, classified according to cause.

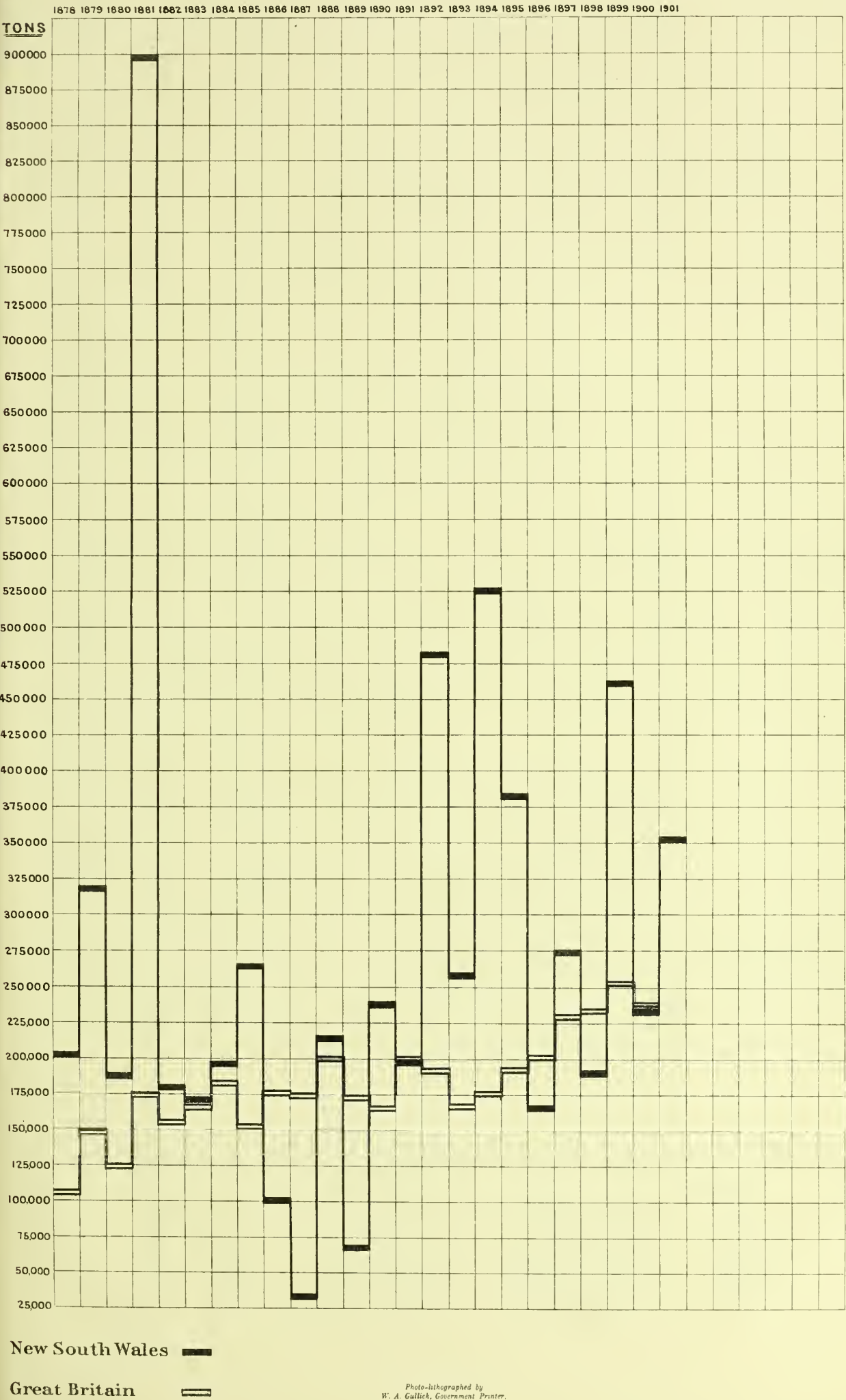
STATEMENT showing the tons of mineral raised, persons employed, lives lost, &c., in Great Britain and Ireland for twenty years, 1881-1900 (both inclusive), in mines under the Coal Mines Regulation Act.

Year.	Output of Mineral.	Persons employed.			Tons of Mineral raised per life lost.	Persons employed per each life lost.	Lives lost per 1,000 persons employed.	Tons of Mineral raised per each person employed underground.	Number of deaths.	Death-rate per 1,000,000 tons of mineral raised.
		Above.	Below.	Total.						
1881	163,959,931	96,030	399,387	495,417	177,106	519	1·925	423	954	5·646
1882	171,334,032	97,795	406,192	503,987	152,161	447	2·234	421	1,126	6·572
1883	178,763,300	98,237	416,606	514,933	160,605	488	2·046	429	1,054	5·896
1884	174,872,759	93,143	422,233	520,376	185,639	552	1·810	414	942	5·387
1885	173,223,960	96,441	424,191	520,632	150,629	452	2·209	408	1,150	6·631
1886	170,006,959	96,108	423,862	519,970	178,391	545	1·833	401	953	5·605
1887	173,049,795	97,737	428,540	526,277	173,919	529	1·890	403	995	5·750
1888	182,660,163	110,282	438,902	549,184	201,611	606	1·649	416	906	4·862
1889	189,633,656	118,209	463,603	581,809	170,533	523	1·911	409	1,112	5·611
1890	194,605,887	125,568	506,812	632,380	162,149	530	1·888	383	1,194	5·960
1891	197,693,592	131,892	556,001	667,983	196,710	665	1·504	368	1,005	4·952
1892	191,954,908	131,330	549,312	683,642	188,932	673	1·486	349	1,016	5·110
1893	175,236,857	133,270	549,738	683,008	165,317	644	1·552	318	1,060	6·049
1894	199,451,018	135,562	563,678	705,240	176,975	625	1·598	350	1,127	5·651
1895	201,738,351	135,646	564,638	700,284	193,606	672	1·488	357	1,042	5·165
1896	208,503,568	135,658	557,026	692,684	203,418	675	1·479	374	1,025	4·916
1897	215,145,025	136,908	558,305	695,213	231,338	747	1·337	385	930	4·323
1898	215,161,954	139,770	567,124	706,894	236,962	763	1·028	379	908	4·220
1899	233,319,084	146,090	583,009	729,099	254,715	795	1·256	400	916	3·926
1900	238,201,275	155,829	624,223	780,052	235,465	770	1·297	382	1,012	4·246
Totals	3,853,606,464	2,419,475	9,989,559	12,409,034	.....	.....	.....	.....	20,427	.....
Averages ..	192,680,323	120,973	499,477	620,456	188,652	607	1·646	385	1,021	5·300

STATEMENT showing the tons of mineral raised (coal and shale), persons employed, lives lost, &c., in New South Wales for twenty years, 1881-1900.

Year.	Output of Mineral.	Persons employed.			Tons of Mineral raised per life lost.	Persons employed per each life lost.	Lives lost per 1,000 persons employed.	Tons of Mineral raised per each person employed underground.	Number of deaths.	Death-rate per 1,000,000 tons of mineral raised.
		Above.	Below.	Total.						
1881	1,797,491	811	3,518	4,329	898,745	2,164	0·462	511	2	1·112
1882	2,157,346	1,072	3,832	4,904	179,779	409	2·446	563	12	5·562
1883	2,570,707	1,216	4,558	5,774	171,380	385	2·597	564	15	5·835
1884	2,780,727	1,232	5,111	6,343	198,623	453	2·207	544	14	5·034
1885	2,906,323	1,680	5,741	7,421	264,211	675	1·482	506	11	3·784
1886	2,873,738	1,531	6,416	7,947	99,905	274	3·649	447	29	10·091
1887	2,962,507	1,562	6,556	8,118	31,516	86	11·579	452	94	31·729
1888	3,238,311	1,827	7,727	9,554	215,577	637	1·570	419	15	4·632
1889	3,696,193	1,944	8,461	10,405	90,151	257	3·940	436	41	11·092
1890	3,116,886	2,073	8,431	10,504	239,760	808	1·237	369	13	4·170
1891	4,078,237	2,146	8,934	11,080	194,202	527	1·895	456	21	5·149
1892	3,855,165	1,969	8,941	10,910	481,896	1,364	0·733	431	8	2·075
1893	3,333,987	1,787	8,569	10,356	256,460	796	1·255	389	13	3·899
1894	3,693,246	1,745	7,672	9,417	527,606	1,345	0·743	481	7	1·895
1895	3,798,013	1,699	7,681	9,371	379,801	937	1·037	494	10	2·633
1896	3,941,354	1,761	7,699	9,460	164,223	394	2·537	512	24	6·089
1897	4,417,681	2,009	8,323	10,332	276,105	615	1·548	530	16	3·621
1898	4,735,949	2,130	8,389	10,519	189,438	420	2·376	564	25	5·278
1899	4,633,747	2,165	8,358	10,523	463,374	1,052	0·950	554	10	2·158
1900	5,530,359	2,386	9,105	11,491	230,431	479	2·088	607	24	.....
Totals	70,117,967	34,736	144,022	178,758	.....	.....	.....	.....	404	.....
Averages ..	3,505,898	1,736	7,201	8,937	173,559	442	2·26	480	20·2	5·761

Diagram showing the quantity of Mineral raised per life lost in New South Wales and Great Britain from 1878 to 1901 inclusive



ACCIDENTS from Explosions of Fire-damp or Coal-dust, classified according to Cause.

Cause of Explosion.	No. of Fatal Accidents.	No. of Deaths.	No. of Non-fatal Accidents.	No. of Persons Injured.
Naked lights	1	3	3	6
Safety-lamps .....	.....	.....	.....	.....
Shot firing .....	.....	.....	.....	.....
Miscellaneous .....	.....	.....	.....	.....
Totals.....	1	3	3	6

EXPLOSIONS of Fire-damp and Coal-dust.

The only accident under this head involving loss of life was the explosion at Burwood Colliery on 13th November.

Date and Hour.	Colliery.	Seam.	Barometer.		Number Killed.	Number Injured.
			Height.	Rising or Falling.		
13th November, 1901, 8.0 a.m.	Burwood	Borehole	30.325	Rising	3	6

(From information kindly supplied by the Government Astronomer.)

The accidents referred to in the foregoing table are No. 13 in the list of fatal accidents which happened at the Burwood Colliery on 13th November, causing the death of three persons and injuries to six others; and Nos. 45, 165, and 174 on the non-fatal accident list, which latter occurred at Waratah, Brown's No. 4 Colliery, Minmi, and Seaham Colliery. The explosion at Burwood was the subject of an inquest extending over ten days, held before Mr. G. C. Martin, J.P., Coroner for the district of Newcastle. Mr. G. C. Westgarth appeared on behalf of the Scottish Australian Mining Company, whilst Mr. Dixon and myself were present on behalf of the Department of Mines. Mr. Curley, Secretary to the Colliery Employees' Federation, attended on behalf of the relatives of the deceased.

The following verdict was returned:—

We find that the said John Molloy, in the No. 3 Burwood Colliery, in the district of Newcastle and in the State of New South Wales, on the thirteenth day of November, one thousand nine hundred and one, came to his death by an explosion of gas, caused by the neglect of Samuel Selby, the Examining Deputy, in failing to examine No. 4 stenton.

Rider.

We consider that the Examining Deputy, Samuel Selby, failed to examine the working places in the shaft crosscut. We also consider that Follins was incompetent to carry out the duties he was entrusted with according to the Act, and that Mr. Brock failed in his duty as Under Manager in not personally seeing the canvas restored and that the ventilation took its proper course, according to special Rule No. 3; and also in not withdrawing the men while the repairs were being made, according to Rule No. 7 of the Coal Mines Regulation Act.

We consider that a proper examination means that he shall examine roof, face, and sides, and test for any gases with a locked safety-lamp, and examine all roads where either men or horses travel.

We are of opinion that a fixed board should be at each station, and that safety-lamps should be used in all mines where brushing or taking down roof is carried on, and also in all mines giving off gas.

Shafts.—Burwood Colliery is the property of the Scottish Australian Mining Company. There are four shafts in connection with the colliery, two of which are situated near the Lagoon, and known as Old Burwood, whilst the other two are situated at Redhead. The former shafts are 270 and 320 feet deep respectively; both are downcasts, and one is used as the second outlet and for pumping water.

The two shafts at Redhead, about 90 chains south-west of the former, are 600 feet deep, one of which is a downcast and winding shaft, whilst the other is the upcast. It is here where all the coal is drawn to the surface, and the principal operations in connection with the colliery are conducted.

Seam worked.—The only seam being worked is the Borehole, from 5½ to 6 feet in thickness, the workings of which adjoin those of the Dudley Colliery, where an explosion took place in March, 1898, resulting in the deaths of fifteen persons.

Ventilation.—Prior to December, 1900, the ventilation was produced by means of a furnace at the bottom of the No. 2 shaft at Old Burwood, which is 320 feet deep. In the beginning of December, 1900, the furnace was superseded by a Walker Indestructible Fan, 20 feet diameter and 8 feet wide, erected at the top of the No. 4 shaft at New Burwood, and distant about 70 yards from the winding shaft. Since that time the ventilation of the colliery has been much improved; in fact, the quantity of air circulating has been about doubled. The annual return sent in for 1901 shows the total quantity in circulation to be 144,970 cubic feet per minute. At the time of the accident the fan was making over eighty revolutions per minute, and had not been stopped for some weeks.

Persons employed.—The underground workers at the colliery number about 340, most of whom were in the pit at the time when the explosion occurred. It was very fortunate, therefore, that the explosion was quite local in its effects, otherwise the number of deaths might have been much larger.

Management.—The General Manager of the Company is Mr. Thos. Croudace, and the certificated Manager Mr. F. H. L. Croudace. The Under Manager is Mr. John Brock, who took up the duties of the position some eighteen months prior to the accident referred to.

Lights used Underground.—The south side only was worked by means of safety-lamps, and the Scotch miners' lamp attached to the cap was used in the shaft crosscut district where the explosion happened, as well as in the workings on the north side of the pit. In consequence of representations made by the late Mr. John Dixon, Senior Inspector in the Northern District, and myself, the management had caused safety-lamps to be used in the south side workings from about the commencement of the year 1900.

Gradient of Shaft Crosscuts.—The faces of the shaft crosscuts at the time of accident were more than 30 feet to the rise of the winding shaft bottom, and they rise more rapidly in the second half of the distance from the shaft than in the first.

Ventilation

DETAILS.

Length of Front cross-cut from Shaft bottom to face—18 chains.

1. Stenton-return from Over-cast for East side.

2. Stenton with double doors uninjured.

3. Stenton 9in. brick stopping blown towards return.

4. Stenton used as a wheeling road for stowing debris.

"A" shows position of full skip and limbers—back-end of skip forced off rails towards pillar-side; stacked timber also blown about and towards return.

5. Face-stenton.

The cross-outs driven double from No. 3 stenton for a distance of 6 chains.

Route taken by the Examining Deputy on morning of the accident is shown thus— ————>

Route travelled by the Under Manager, through No. 4 stenton up the back cross-cut, with NAKED LIGHT, is shown thus— ————>

The evidences of force are shown by (—>—>)—that is, the direction of the blast.

Horse attached to full skip in No. 4 stenton was badly burnt.

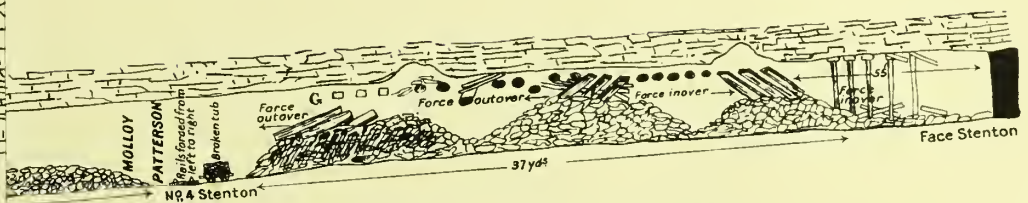
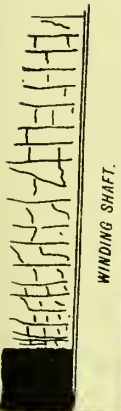
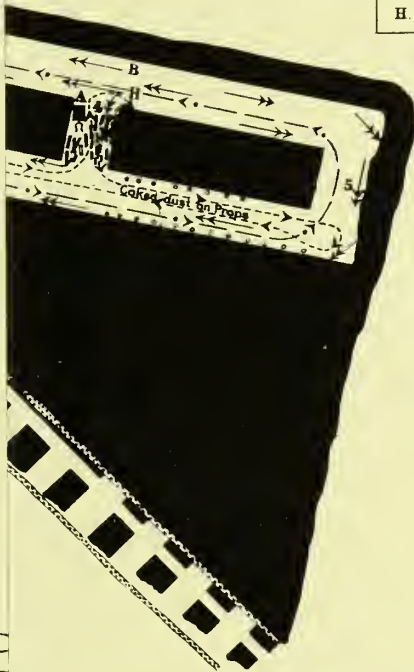
John Champion, the driver, was burnt and otherwise injured in No. 4 stenton—he was found after the accident by McDougal, who met him making way out in the dark at a point 7 yards in bye of No. 3 stenton.

"B," opposite No. 4 stenton, Molloy's shirt and waistcoat found with watch in pocket.

Searle was met out bye of No. 3 stenton.

Hansen escaped by the double doors of No. 2 stenton.

H. Peterson's lamp found uninjured, but without wick.



SKETCH PLAN of Shaft East Cross-cuts. **BURWOOD COLLIERY**

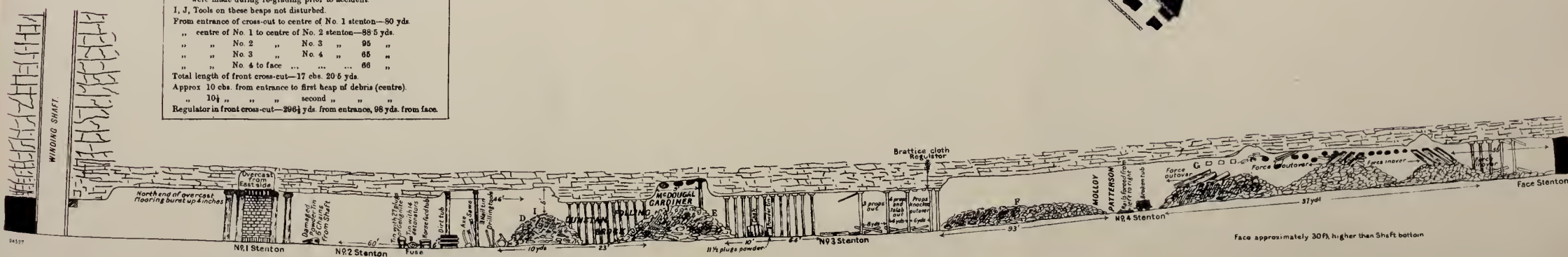
SEAT OF EXPLOSION, 13TH NOVEMBER, 1901.

DETAILS.

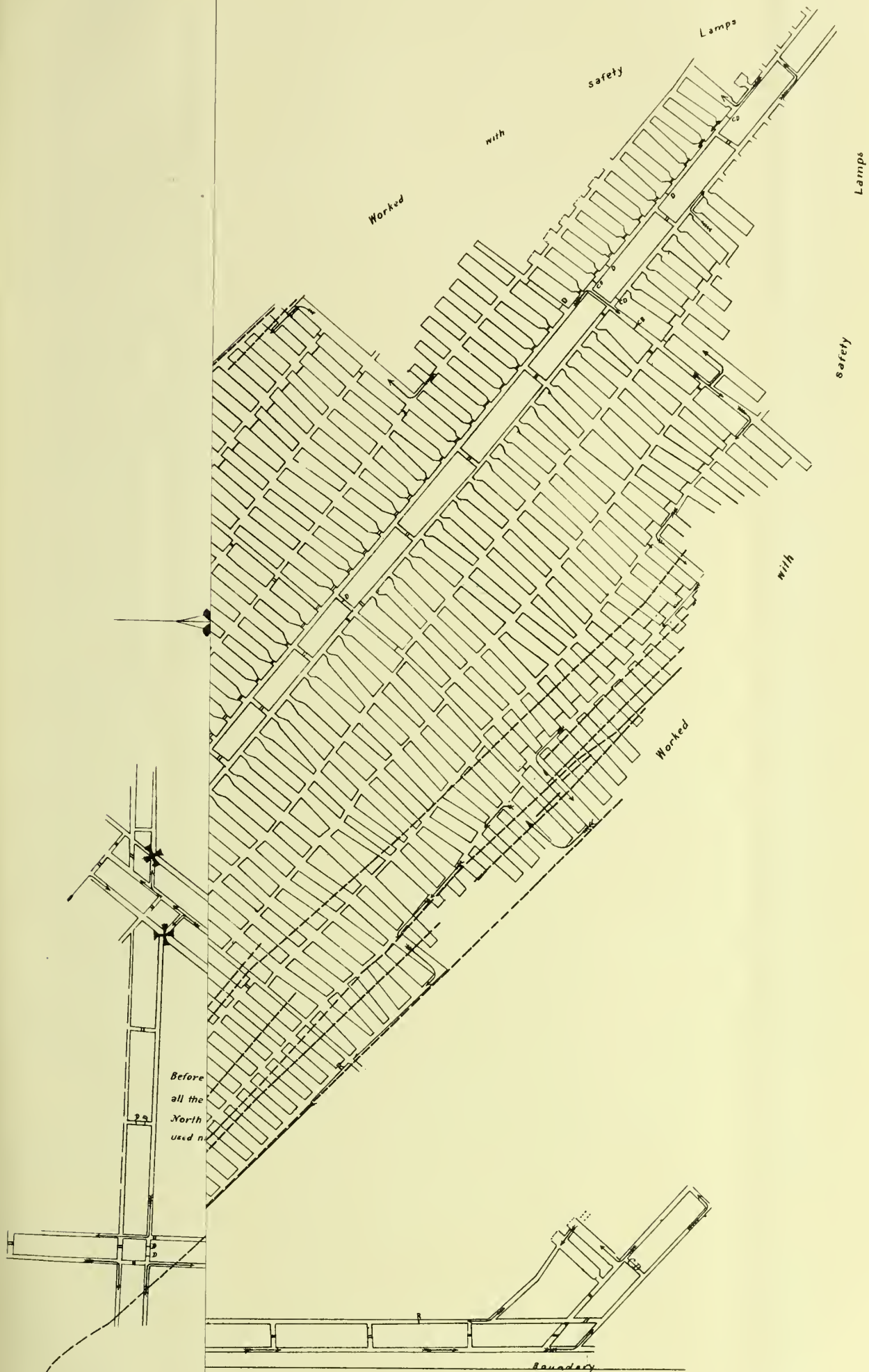
Length of front cross-cut from Shaft bottom to face—18 chains.
1 Stenton-return from Over-cast for East side.
2 Stenton with double doors uninjured.
3 Stenton 9in. brick stopping blown towards return.
4 Stenton used as a wheeling road for stowing debris.
"A" shows position of full skip and limbers—back-end of skip forced off rails towards pillar-side; stacked timber also blown about and towards return.
5 Face-stenton.
The cross-cut driven double from No. 3 stenton for a distance of 6 chains.
Route taken by the Examining Deputy on morning of the accident is shown thus—
Route travelled by the Under Manager, through No. 4 stenton up the back cross-cut, with NAKED LIGHT, is shown thus—
The evidences of force are shown by (—>—>)—that is, the direction of the blast.
Horse attached to full skip in No. 4 stenton was badly burnt.
John Champion, the driver, was burnt and otherwise injured in No. 4 stenton—he was found after the accident by McDougal, who met him making way out in the dark at a point 7 yards in bye of No. 3 stenton.
"B," opposite No. 4 stenton, Molloy's shirt and waistcoat found with watch in pocket.
Searle was met out bye of No. 3 stenton.
Hansen escaped by the double doors of No. 3 stenton.
H. Peterson's lamp found uninjured, but without wick.

SECTION OF FRONT CROSS-CUT AFTER THE EXPLOSION.

On top of last balk above 1st heap of shale the Under Manager's lamp was found smashed by force of the blast—place marked "C."
D, E, F, G, heaps of shale; heaps D, E, F, and outer portion of G were made during re-grading prior to accident.
I, J, Tools on these heaps not disturbed.
From entrance of cross-cut to centre of No. 1 stenton—80 yds.
" centre of No. 1 to centre of No. 2 stenton—98 5 yds.
" " No. 2 " " No. 3 " 95 "
" " No. 3 " " No. 4 " 65 "
" " No. 4 to face " " " 66 "
Total length of front cross-cut—17 chs. 20 5 yds.
Approx 10 chs. from entrance to first heap of debris (centre).
" 10 1/4 " " " second " " "
Regulator in front cross-cut—296 1/2 yds. from entrance, 98 yds. from face.



Plan A

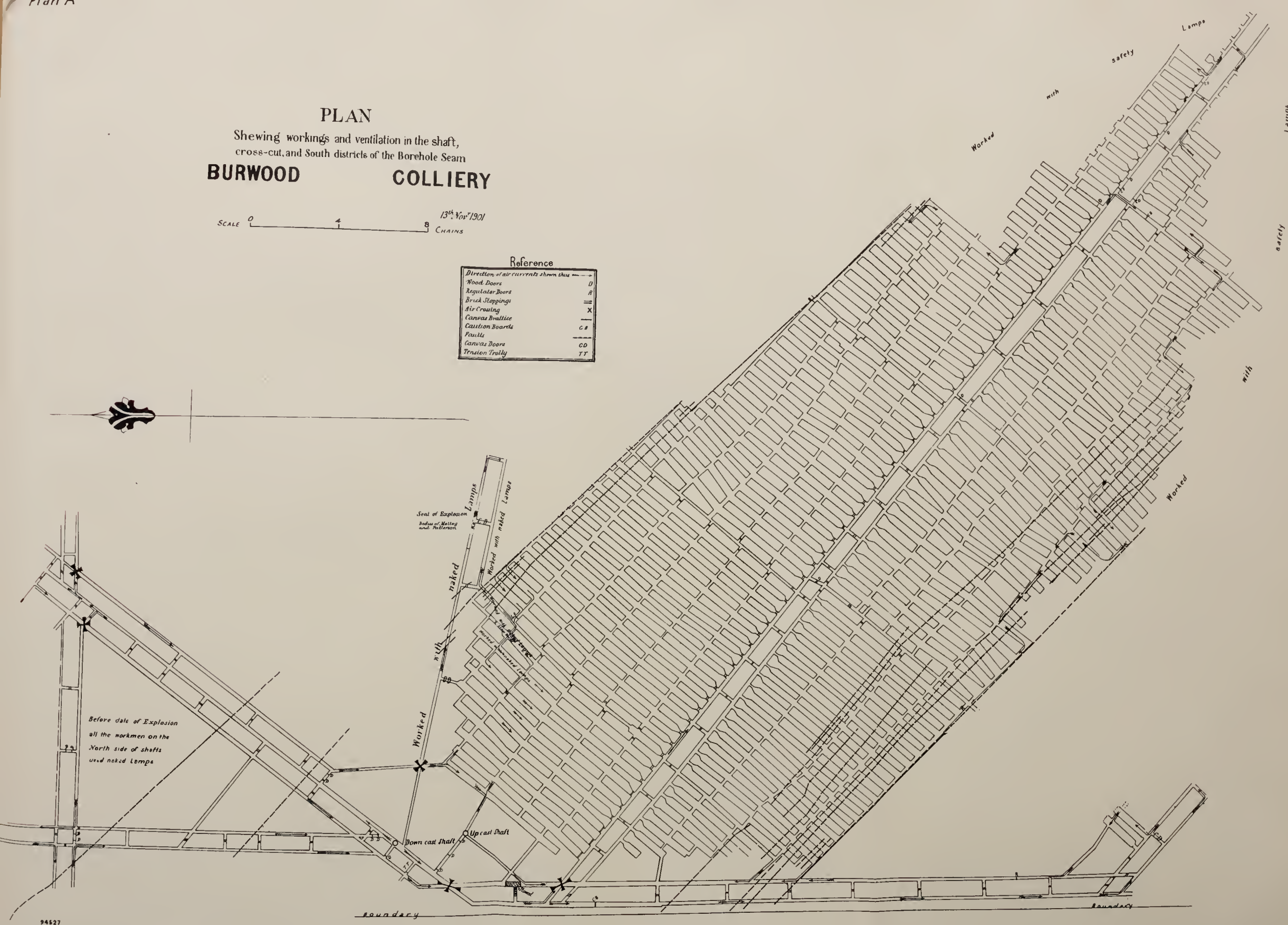


PLAN Shewing workings and ventilation in the shaft, cross-cut, and South districts of the Borehole Seam **BURWOOD COLLIERY**

SCALE 0 4 8 CHAINS 13th Nov 1901

Reference

Direction of air currents shown thus	→
Wood Doors	D
Regulator Doors	R
Brick Stoppings	—
Air Crossing	X
Canvas Brattice	—
Caution Boards	C.B.
Faults	—
Canvas Doors	C.D.
Tension Trilky	T.T.



94627

Ventilation of Shaft Crosscuts.—The quantity of air circulating in the shaft crosscuts, as measured by Mr. Dixon about a fortnight before the explosion, amounted to 10,800 cubic feet per minute.

At the time of the accident in the shaft cross-cut district no coal-getting operations were going on, as the road was being permanently timbered and regraded, in order to facilitate future haulage operations, and for this purpose from 2 ft. 6 in. to 3 feet of the shale roof had been blasted down for a considerable distance from the face, most of which shale was lying on the floor. From evidence adduced no blasting had taken place on the morning of the accident. The attached plan (A) shows the workings of the shaft crosscuts, as also the adjoining workings of the south side district, in the latter of which, in all the coal or working faces, safety lamps were in use, and had been since about the beginning of the year 1900. The plan and section marked B is a hand sketch, not drawn to scale, by Mr. Dixon, which will better illustrate some of the features of this accident. According to the report of the Examining Deputy, Samuel Selby, who had made his examination with a locked safety lamp, all was right and free from firedamp in the shaft cross-cut district about 3 o'clock on the morning of the accident. The only shift working in that district came on about 7 a.m. Two of the deceased, John Molloy and William Patterson, were engaged filling away the roof stone which was lying on the floor on the inlying side of No. 4 stenton, whilst John Champion was the wheeler employed for the purpose of taking the full tubs to the stowboard, returning with empty ones. It may be mentioned that the deceased, as well as the men who were injured, as also those who were working in the stowboards, used naked lights. No gas had been seen in the shaft crosscuts since the month of March last, and then only in small quantity. Prior to the time when it was necessary to use the back crosscut for the purpose of wheeling the debris to the stowboards, the regulator for this district had been in the back crosscut between Nos. 3 and 4 stentons, but in consequence of the wheeling operations the management removed this and put a regulator which consisted of two or three sheets of canvas brattice in the position marked R on plan A. The canvas brattice door in No. 4 stenton for the purpose of directing the air into the face of the crosscut and round No. 5 stenton, according to the evidence of John Brock, was somewhat disarranged when he went through shortly after 7 o'clock on the morning of the accident, and he stated in evidence that he gave instructions to John Molloy, one of the deceased, to repair this canvas. He (Mr. Brock) was also carrying a naked light. After having given these instructions he went round to the stowboards and to the other men who were working about 100 yards on the outbye side of No. 4 stenton in the front crosscut. After having been there some little time, and about half-an-hour after the time he stated that he had given instructions for repair of the canvas door in No. 4 stenton, the explosion occurred. In consequence of the force exerted by the explosion not being very great at any point on the outbye side of No. 4 stenton, there was little damage done to the air crossing at No. 1 stenton, the timbers of which were only raised a few inches; nor were the double doors in No. 2 stenton blown out, the brick work only being slightly shattered. The ventilation was soon restored up to No. 3 stenton, at which point the brick stopping had been blown towards the return. A temporary stopping of canvas was put in here, and the ventilation restored up to No. 4 stenton. Little time, therefore, was lost in getting to the point where the three deceased men had been working, and they were soon got out of the pit. Molloy was dead when found and Patterson died in the local hospital a few hours after. Champion died in Newcastle Hospital on the 15th November, 1901. All three were burned, but Patterson more severely than the other two. In my opinion the explosion was caused by the naked light of Molloy or Patterson coming into contact with a small quantity of gas which had accumulated near the roof above the shale heap on the inbye side of No. 4 stenton, and which heap the men were supposed to be filling into tubs to be subsequently stowed. There is evidence that the explosion was propagated to some extent by the assistance of coal dust, coked deposits of which were afterwards found in both the front and back crosscuts. Fortunately, in consequence of the roof stone which had been blasted down, lying on the floor in the front crosscut, and the absence of coaldust in the back crosscut, partly due to the fact that a considerable quantity of stone-dust had been lately deposited therein as a result of wheeling such debris to the stowboards, there was no evidence of flame beyond a point about 15 yards on the outbye side of No. 4 stenton in either crosscut. Had these conditions not existed, it is difficult to say how far the explosion might have been carried with the assistance of coaldust.

I may say that Mr. Dixon also concurs in this view, except that in his opinion the ignition was caused by the light of Patterson.

After the circumstances were duly reported, with the permission of the Secretary for Mines, proceedings were instituted against the manager, under manager, and examining deputy, in consequence of the evidence elicited at the inquest, with the result that the manager was fined £20 for failing to appoint a competent person under General Rule 4, section 47, to inspect during the shift; the under-manager was fined £2 for an error of judgment in failing to withdraw the workmen (General Rule 7, section 47), and the examining deputy was fined £2 for failing to inspect No. 4 stenton (General Rule 4, section 47). I understand that an appeal is to be made against these decisions.

Since the explosion, safety lamps have been introduced into all the workings of this colliery, with the exception of the main roads up to the points where the caution boards are fixed.

Under similar conditions to those reported in this case, when roof stone is being taken down, colliery managers would act wisely if they gave instructions that only safety lamps should be used during such an operation. More especially is this precaution necessary for the inbye sets of workmen where the roof stone is being taken down in sections by different sets of men.

FIRE-DAMP AND USE OF SAFETY LAMPS.

During the year fire-damp has been reported under General Rule 4 at the following Collieries, viz.:—Metropolitan, Bulli, Corrimal, South Clifton, South Bulli, and Mount Pleasant in the Southern or Illawarra District; and Wallsend, Burwood, Waratah, New Lambton, Lambton B, Seaham, West Wallsend, Killingworth, Dudley, Newcastle Coal Mining Company's A pit, and Duckenfield in the Northern District. It has also been reported in the sinking shaft of the Sydney Harbour Colliery, Balmain. Safety lamps are used for the purpose of inspection, under General Rule 4, at the Collieries named above, as well as at Osborne-Wallsend, Coal Cliff, Bulli Pass, Bellambi, and Mount Kembla in the Southern District; and Wallarah, Brown's Minmi, East Greta, Curlewis, and Gunnedah, in the Northern

Northern District. They are used exclusively in the underground workings of the Metropolitan and Killingworth Collieries, and in all but the main intake airways of the Dudley, Burwood, and Lambton B Collieries. During portion of last year they were used in one district of the South Clifton Colliery, but have since been taken out. In those Collieries in which fire-damp has been seen during the past twelve months, I desire to point out to Colliery Managers that however small may have been the quantity of gas it is necessary that the inspections under General Rule 4 should be made with a locked safety lamp. This also includes the inspection during shifts, although the workmen may be using naked lights.

It is to be regretted that considerable opposition to the use of safety lamps is still displayed by the owners, managers, and workmen in connection with collieries where small quantities of fire-damp are more or less regularly given off. The ventilating arrangements or part of them, however perfect, may in consequence of human fallibility, occasionally become deranged, possibly resulting in an accumulation of gas which may inadvertently be ignited by some person carrying a naked light. In such mines the only effectual means of guarding against such a misadventure is by adopting and using safety lamps.

General Rule 8, section 47, of the Coal Mines Regulation Act, is not satisfactory as regards the use of safety lamps. The same applies to the rule in Great Britain, where the inspectors have recommended the substitution of the following:—"No lamp or light other than a locked safety lamp shall be used in any seam of a mine in which, after the date of this Rule any ignition of inflammable gas occurs, or in which there is likely to be such a quantity of inflammable gas as to render the use of naked lights dangerous. All safety lamps shall be cleaned, trimmed, examined, lighted, and locked in a proper lamp room on the surface, before being issued for use. All safety lamps shall be provided with locks incapable of being surreptitiously opened without detection."

If a rule of this character were adopted in place of General Rule 8, it would be more satisfactory, as the necessity for the adoption of safety lamps is much more clearly defined therein.

ACCIDENTS from Falls of Roof and Side, classified according to the place where they happened.

Place where the fall occurred.	Number of Fatal Accidents.	Number of Deaths.	Number of Non-fatal Accidents.	Number of Persons Injured.
At the working face	6	6	78	78
On roads while repairing or enlarging .....	.....	.....	.....	.....
On roads while otherwise working or passing	1	1	2	2
Total from falls underground	7	7	80	80

FALLS OF ROOF AND SIDE.

As compared with the year 1900, there are 2 more fatal accidents resulting in the deaths of 2 more persons; and the non-fatal accidents show an increase of 10, with injuries to 6 more persons.

These accidents can only be prevented by the exercise of greater care on the part of the workmen themselves, and by better supervision on the part of officials, who should insist upon a strict compliance with the provisions of General Rule 22. In connection with the legal aspect of the requirements of sprags, as defined in General Rule 22, the following report of a Judgement in the Higher Courts of England may be of interest:—

REPORT OF THE CASE OF GIBBON V. PHILLIPS.—(65 L.J., M.C. 42.)

Rule 22 of section 49 of the Coal Mines Regulation Act, 1887, provides for the use of sprags or holing props in mines to support the top coal whilst the bottom coal is being worked. Upon their true construction, the words of that rule, "where they are required," mean where they are "necessary," and not where the workmen think them necessary. Whether they be necessary or not is a question of fact to be decided by the Justices in each case.

This was a case stated by Justices, who had dismissed a summons on the information of the Appellant against the Respondent for that he, on the 3rd of May, 1894, at the parish of Merthyr Tydfil, being a person employed as a collier in a certain mine there, namely, the Ocean Colliery, Treharris, did unlawfully commit a breach of the Special Rules then in force in the said mine, in that he did not place in his working place props and sprags in accordance with the 22nd general rule under section 49 of the Coal Mines Regulation Act, 1887. Rule 22 is as follows:—"Where the timbering of the working places is done by the workmen employed therein, suitable timber shall be provided at the working place, gate-end, pass bye, siding, or other similar place in the mine convenient to the workmen, and the distance between the sprags or holing props where they are required shall not exceed six feet, or such less distance as may be ordered by the owner, agent, or manager." The point was whether the Respondent had not carried out the rule in not propping or spragging the coal he was working. The manner of working in the particular colliery was for the collier to work the under coal away and then permit the upper coal to sink down by the pressure above it. So long as the bottom coal remained the top coal was propped by it. The Appellant contended that the top coal directly it overhung the perpendicular should at all times be propped, as imperatively required by Rule 22, at a not greater distance than six feet apart, and at a less distance than six feet if directed by the owner. The Respondent contended that it should be propped only when required, relying upon the words, "where they are required," in the rule. The issue between the parties was raised by these words, and the question was who had to decide when the coal required propping. The Justices found as facts that all coal did not require propping. That there was no general instruction to the workmen that all over-hanging coal, whether apparently safe or not, required propping. That in this instance, as admitted by the Appellant's witnesses, the coal at 5.40 in the morning was safe without propping, and also at 8.15, and the officials who examined the place did not draw the attention of the Respondent to the necessity of propping. That at about noon the manager called the attention of the Respondent to the position of the coal and required it to be propped, and the Respondent at once propped it. That the Respondent considered the coal safe without propping. The Justices thereupon found that as there were no general directions to workmen to prop all over-hanging coal, whether apparently dangerous or not, the Respondent had not committed a breach of the Rule, because directly it was pointed out to him that the coal required propping he placed the requisite props. The question for the Court was—first, whether the Justices were right in deciding that, there being no general directions for propping all over-hanging coal, the Respondent had the right to exercise his discretion and decide when it was required to prop the coal; and, secondly, if the Court should be of opinion that the Respondent had no discretion, whether, since he propped the coal directly the manager told him to do so, the coal was propped when required.

W. Denman Benson, for the Appellant.—This colliery is worked on the Nottingham or Long Wall system, and the method adopted is to work away the bottom coal so as to allow the upper coal to sink and take its place. Rule 22 was framed especially to meet the danger involved by this method of working, and casts a duty on the manager to supply the workmen with timbers. A sprag is a piece of timber, and a holing-prop is a more complete prop than a sprag. The Appellant, when he surveyed the work the Respondent was engaged upon at noon, found a vacuum fourteen feet in length and eighteen inches in depth; the upper portion of roof had partially parted and was bending slightly over. It required spragging. The Justices found that whether sprags were required or not was in the discretion of the man at work. This, it is submitted, is not the case; the word "required" means not only when spragging is ordered, but when it was "necessary" for safety. This was the question the Justices ought to have considered.

Bowen

Bowen Rowlands, Q.C., for the Respondent.—The Justices have found all the facts essential for them to find. The rule cannot mean that a workman has no discretion. Moreover, the Respondent in the present case complied with the order immediately it was given.

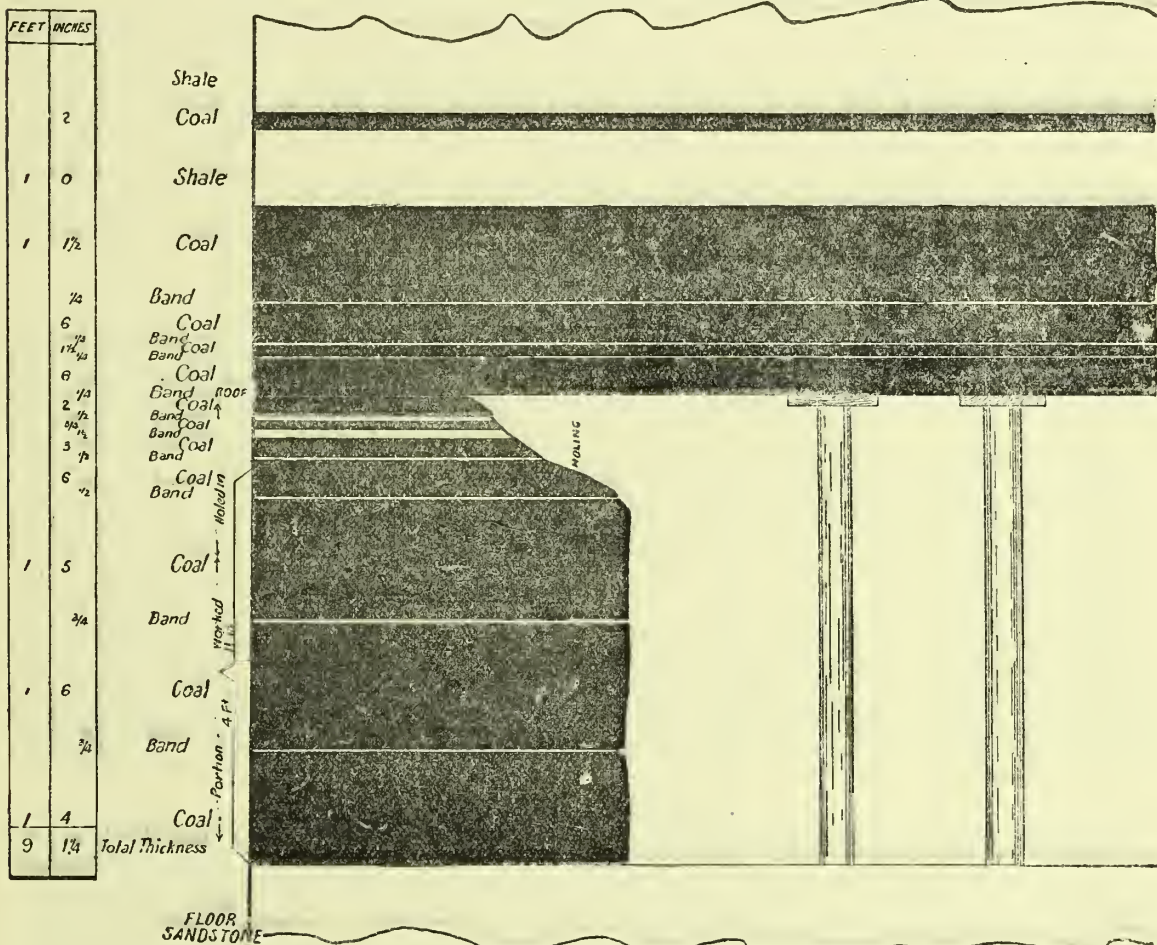
Wills, J.—I think the meaning of this rule is perfectly clear, and it is only a matter of surprise to me that any one should have misunderstood it. The words "where they are required," to my mind, clearly mean where they are "necessary," and not where the workmen think they are necessary. Very many workmen think nothing necessary which is merely required for safety. They are constantly willing to run frightful risks, and jeopardise their own lives and the lives of other, to avoid a little trouble; and a rule of this kind is intended to prevent, as far as possible, the fatal consequences to which such carelessness may give rise. The answer to the first part of the question seems to be perfectly clear, that is to say, that sprags or props are required where necessary; and if they are necessary, the rule provides that the distance between them is not to exceed six feet or such less distance as the person in authority may direct. Therefore, whether they are necessary or not is a question of fact to be decided by the Justices in each case. Now, what they have decided here is, that, as there were no general directions given to workmen to prop all over-hanging coal—directions which the rule clearly does not contemplate—the Respondent had a right to exercise his own discretion in the matter of sprags or props. In one sense, of course, a workman must exercise his discretion, but he must do so subject to this control—that if he does not exercise it rightly, and the Justices think he has not exercised it rightly, then he is liable to be convicted. In each case the Justices must consider whether, as a matter of fact, sprags or props were or were not required to support the top coal. The second part of the question is whether, the Respondent having propped the coal directly the manager told him, the coal was propped when required. I have already intimated that that is a total misapprehension of the word "required." The Justices have clearly applied the wrong test, and have never directed their attention to the proper question. The case must go back to them to consider whether the propping was or was not in fact required under the circumstances and at the time.

Wright, J.—I am of the same opinion.

Appeal allowed.

In order to show that some of the collieries in this State can give a good record in regard to accidents by falls of roof and sides, I append the following notes touching the Seaham and West Wallsend Collieries.

During the seven years ending on 31st December, 1901, the above mines have put out 1,981,002 tons of coal without having reported a single fatal or non-fatal accident from fall of roof or side. The seam worked is the Borehole. The attached sectional sketch shows the continuance of the seam and the method of holing. The depth below surface varies from 470 to about 600 feet, the dip being about 1 in 28 south-west.



SECTION OF SEAM AND METHOD OF WORKING SAME AT SEAHAM AND WEST WALLSEND COLLIERIES.

Accidents from falls of roof and sides are not always preventable, but some which are recorded should not occur, and it is only in the following ways that a decrease in this class of accidents may be expected:—

- 1st. Greater care on the part of the workmen themselves, who should always attend first to work conducing to their safety.
- 2nd. More frequent supervision of working places by competent officials, who should strictly enforce the general and special rules bearing on this matter.

During

During twenty years, ending with 1900, 166 lives have been lost by falls of roof and sides in this State, and this represents 42·78 per cent of the total deaths during this period.

The systematic method of timbering is quite deserving of serious consideration by colliery managers and miners, who should adopt it if they are of opinion that the fatalities under this head can be reduced.

SYSTEMATIC TIMBERING IN MINES.

This matter has been the subject of much discussion in Great Britain during the past two or three years by colliery owners and managers, and also by miners.

Considerable divergence of opinion has been shown on the question of the necessity for enforcing the use of timber supports for the roof at certain stated distances in the different seams, as the conditions of roof in the same seam may vary considerably. At some collieries the systematic timbering has been adopted for some years, as may be gathered from the following special rule, taken from the South Staffordshire district:—

“The manager shall adopt a uniform system of timber propping at stated distances in the faces of work under his charge, or in any part of the mine which, in his judgment, requires it.”

The systematic method of timbering continued to cause considerable discussion in the mining community of Great Britain during last year, and, at the instance of the Home Secretary four of the English Inspectors visited the Courrières Collieries in France, and made the following report, which I consider of sufficient importance to give in full:—

Report to the Secretary of State for the Home Department on the Methods of Preventing Falls of Roof adopted at the Courrières Collieries, by four of His Majesty's Inspectors of Mines.

Sir,

Chester, December 22nd, 1900.

In accordance with the instructions conveyed in your letter of the 30th October, after our visit to the Courrières Collieries in the Department of the Pas-de-Calais, we have the honour to report that we inspected some of the working places of those collieries with special reference to the method of timbering, to which your attention had already been drawn in the “General Report” for the year 1899,* edited by Dr. Le Neve Foster.

Dr. Le Neve Foster's description of the methods of support and his remarks were founded upon the full-size representation of the working places of the Courrières Collieries shown at the Paris Exhibition, and upon information and diagrams supplied to him by the Company.

It will be remembered that the statistics of fatal accidents by falls of ground† at Courrières, for three successive decades, showed a striking improvement during the periods in which systematic timbering had been enforced, along with increased supervision.

The object of our visit was to see, in practical operation, the methods adopted at the Courrières Collieries for guarding against accidents by falls, and to ascertain the general conditions under which the work was carried on; we were also anxious to assure ourselves that the means adopted were adequate to account for the results obtained, and to see to what extent the system might be applicable to British mines.

We arrived at Lens on the evening of the 23rd October, and the following day was devoted to an underground inspection of some of the workings of the Louise seam, at the No. 10 pit of the Courrières Concession, and to obtaining information on various matters which appeared to be important to our inquiry.

The second day of our stay was spent in visiting two pits belonging to the neighbouring Lens Colliery Company, at one of which we made an underground inspection.

1. GENERAL REMARKS CONCERNING THE COURRIÈRES COLLIÉRIES.

The Courrières Concession, which almost touches the town of Lens, has an area of about 13,500 acres, or 21 square miles; it possesses 44 seams of coal, of which a large number are being worked. The total thickness of the coal in all the seams is 140 feet. The average thickness of the seams of bituminous coal is stated to be 3 feet 7 inches, of the semi-bituminous 2 feet 10 inches, and of the quarter-bituminous 2 feet 8 inches. On the whole, therefore, the seams may fairly be called thin. The roof is almost invariably shale, and the floor a hard underlay. Beds of sandstone are interstratified with the shale, but it is very rarely the case that the roof proper is composed of sandstone, or that there is any sandstone within several yards of the roof.

Parts of the seams are nearly flat, but a dip of 10° to 20° is not uncommon; in places the seams are completely overturned, and here the dip is sometimes as much as 50° or even 60°.

The Courrières Company employs 6,998 persons, of whom 5,794 work below ground. Speaking roughly, about 42 per cent. of the underground workmen are employed in getting coal, 6 per cent. in preparatory workings, and 52 per cent. in haulage and other work.

The output of coal which began in 1851 with 4,000 tons was 1,930,868 tons in 1899, and will probably exceed two millions this year.‡

There are thirteen separate shafts, of which nine are now in use as winding shafts; they vary in diameter from 11 feet 6 inches to 15 feet 9 inches. Where they pass through the Cretaceous rocks, which overlie the Coal Measures, the shafts are tubbed with oak for heights varying from 83 to 117 yards.

The winding ropes are invariably made of Manila hemp (*abœs*, Fr.) and are flat, being composed of six to eight strands. The guides to the cages are of oak, and the winding extremely smooth. At the No. 10 pit, Courrières, which we descended, the cage was double-decked, and had four tubs on each deck. Each cage has safety catches and a detaching hook; the modern pits are further provided with Reumaux's arrangement to prevent overwinding. The depth of the No. 10 pit is 387 yards (354 m.).

2. METHODS OF WORKING.

Where the seams are inclined, the two common methods of working may be regarded as kinds of “longwall” work, differing from the typical “longwall” with its straight continuous face by having a series of short faces arranged step-fashion, each one slightly in advance of its neighbour. These faces advance according to circumstances on the line of strike or to the full rise of the seam. In the former case (*tailles chassantes*) the faces advance on the level course to the right and left of a self-acting incline, each face being 13 yards wide and 9 or 10 yards in advance of the face above. Each of these working places is connected with the incline by a level gate-road. These gate-roads are formed on the low side of each working place and the coal is cast down the face by hand, and filled into tubs at the end of the tram road. There are three miners in each working place.

When the working faces advance to the full rise of the seam (*tailles montantes*), each face is about 17½ yards wide, and is served by a short inclined plane, down which the tubs are lowered to a cross-gateway, along which they are taken to a main incline.

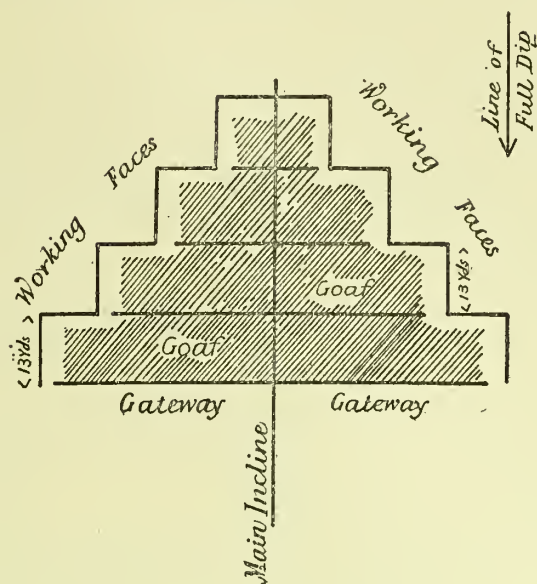
* Mines and Quarries: General Report for 1899. Part II. Labour. p. 74.

† The French term “*éboulement*” is translated by “fall of ground,” which means all kinds of falls of stone, earth, or coal, whether from roof or side; and in this Report it includes falls of roof and side in whatever part of the mine they may have happened.

‡ See Appendix I for the details of the annual output since the Company's formation.

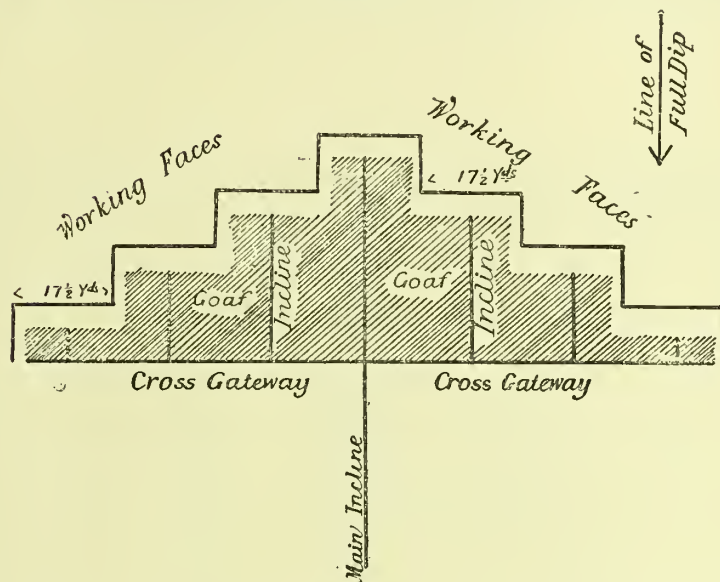
The following diagrams, Figures 1 and 2, illustrate these methods of working :—

Fig. 1.



LONGWALL IN STEPS. FACES ADVANCING ON LEVEL COURSE (*tailles chassantes*).

Fig. 2.



LONGWALL IN STEPS. FACES ADVANCING TO FULL RISE (*tailles montantes*).

some of the comparatively flat parts of the seam a system of pillar work is in vogue, levels are driven 10 metres apart centre to centre, leaving pillars of 8 metres between them. These pillars are worked off in portions (*lifts*) 13 feet wide at a time.

3. METHODS OF SUPPORT.

The main roadways were well lined by masonry, steel, or timber, and in excellent order; here there was very little chance of anyone being injured by a fall. It is more important to consider the branch roadways and working faces, the latter especially being subject to accidents from falls of roof or side.

The chief points to be considered are :—Materials employed, mode of setting the timber, mode of “drawing” the timber, cost of timbering, supervision, and special official regulations upon the subject.

The kinds of timber employed are more various than with us. At Courrières we were told that the following woods were in use for supports :—Pine, oak, birch, ash, cherry, and hornbeam, this last has to be used green. Further information concerning the kinds of timber and the sizes of the pieces employed in the district are given in Appendices II and III. The branch roadways leading to the working places are made by “ripping” the roof or floor after the coal has been “got” in the ordinary way. The “ripping” is done by blasting and by pick work.

These roads are supported systematically by frames or sets of timber, placed 3 feet 3 inches apart; each set is composed of two uprights (*posts* or *props*) upon which rests a horizontal “bar” (*head-piece*, *balk*, *collar*). Light poles (*queues*, Fr.) are laid from “bar” to “bar” at intervals of about 18 inches or 20 inches, so that there is no unsupported roof-space exceeding 3 feet 3 inches by 18 or 20 inches.

Similar light poles or lagging pieces are placed between the props and the side of the road if necessary. We were informed that to provide against small falls of roof, where the roof is very bad, additional small pieces of wood are placed crosswise from pole to pole. During the process of “ripping” the workmen are further protected by iron bars (*allonges*, Fr.) pushed forward above the “bar” of the last frame and made firm by a wedge at the back end.

In some places there seems to be considerable pressure or crush on these roads as they have to be maintained through the goaf.

The

The principle of timbering the working places is to place "bars" 10 to 13 feet long against the roof at intervals of 3 feet 3 inches, and support each "bar" by props at distances of 3 feet 3 inches from each other. Contrary to the usual English practice, the "bars" are placed parallel to the working face, and not at right angles to it.

The roof between two successive "bars" is protected by light poles stretching from "bar" to "bar," and about 18 or 20 inches apart.

As in the case of the roadways, small cross-pieces of timber are laid from pole to pole when the roof is very bad; but the working places which we saw did not require this additional support.

Between the last "bar" (*rallonge*, Fr.), and the actual working face the roof is supported temporarily by iron bars (*allonges*, Fr.), 4 feet 3 inches long by 1½ inches square, the leading ends of which are flattened to a chisel edge. These are pushed forward till they almost touch the working face. When an advance of rather more than 3 feet has been accomplished under this provisional means of support, light poles are put in, one end being supported by the last "bar" and the other by a light temporary prop close to the coal, and the iron bars (*allonges*, Fr.), are withdrawn. As soon as room enough along the face has been excavated for taking the full length of a fresh "bar" (*rallonge*, Fr.), no time is lost in putting it in under the forward ends of the poles and supporting it by the usual props; the temporary props used as provisional supports for the light poles are then taken out. The result is that as the men work their face forward there is no space of roof unsupported exceeding 3 feet 3 inches by 20 inches.

The whole process of support is further explained in Appendix IV, with figures kindly furnished by M. Reumaux, the Director-General of the Lens Collieries.

The Louise seam, where we saw the system of timbering in operation, consisted of 20 inches of top coal, then 24 inches of hard clay or clunch, and 28 inches of bottom coal, and it was dipping at an angle of about 30°. The depth from the surface was about 300 yards. The working places we inspected were in a part of the mine where the seams are completely overturned; the actual roof being formed by the underlay or thill, containing many slippery joints or "backs" and occasional "potholes" (*cloches*, Fr.).

The collier is paid per ton of coal raised, and the price he receives includes packing the rubbish behind him and all the work of timbering. His output is about 3 tons 4 cwt. of coal per shift of 9¼ hours. He brings his own timber to the working place, but the timber store must not be more than 220 yards (200 m.) away from him.

The coal is "got" by the pick, and not blasted, and consequently there is no fear of the timber close to the face being knocked out by shots, as might happen in some British mines.

In the workings we inspected the goaf was packed full, some of the material required being brought from other parts of the mine, and none of the timber was withdrawn. We were informed that it was left because it did not pay to "draw" it, and not for reasons of safety. The general practice is to stow the goaf completely full and leave the timber in, except in seams which are comparatively flat and over 4 feet in thickness. In this latter case the timber is recovered so far as is consistent with safety. Rather more than two-thirds of the total output of coal is got from workings where the goaf is fully stowed and the timber left in. We may not be fully acquainted with all the conditions bearing on this question, but we are somewhat at a loss to understand why it should not be economical to recover some of the timber which is now left buried in the waste.

When the timber is "drawn," the work is done by special workmen, who are provided with three special tools in addition to a sledge. The first (Figs. 3 and 4) has a hammer-head about 9½ inches long, one end for striking and the other pointed for sticking into pieces of timber; the top is serrated so as to grip a prop firmly when it is employed to shove it out. The second (Fig. 5) is a rake with two pointed prongs. The third a cutting chisel, which serves for cutting the edge

Fig. 3.

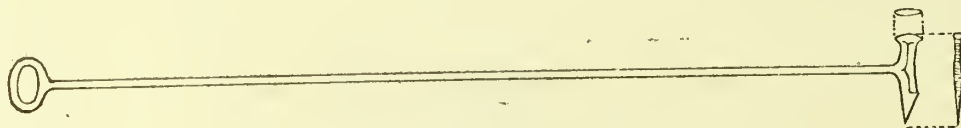


Fig. 4.*

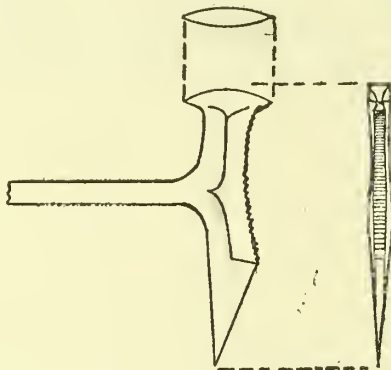
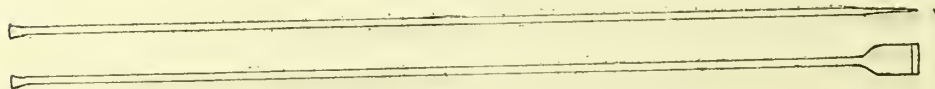


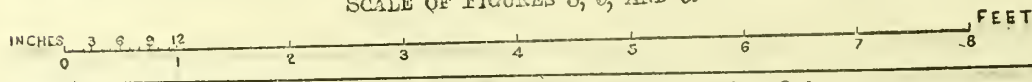
Fig. 5.



Fig. 6.



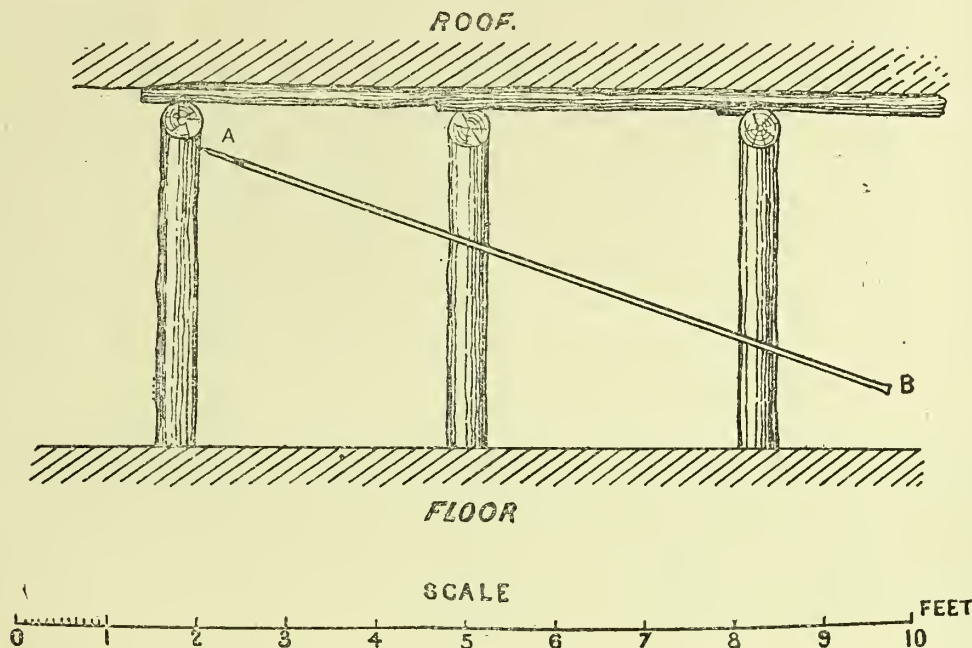
SCALE OF FIGURES 3, 5, AND 6.



* The scale of Fig. 4 is three times as large as that of Figs. 3, 5, and 6.

of the hollow of the "post" in which the "bar" rests, in cases where the "post" cannot be knocked out (Figs. 6 and 7). A is the cutting edge of the chisel, and B the butt end which is struck with a sledge. The tools are made entirely of iron or steel and are 8 feet long.

Fig. 7.



As might be expected from the account just given, the cost of timbering is high. The average cost of the timber at Courrières, irrespective of the cost of setting (which, as already explained, is included in the tonnage price), amounts to about 8½d. per ton of coal, a maximum being about 1s. per ton. As steel sleepers are employed, the timber bill has to be paid solely for purposes of support. The average cost for timber in the Pas-de-Calais is said to be 6¼d. per ton.

In Great Britain the cost of timber varies very much according to the district, not exceeding 2d. in some cases and running up to a shilling in others. East Lancashire will vary from 1d. to 3½d., West Lancashire from 2d. to 5d., and South Wales will probably be higher than any other district.

A translation of the regulations which are now in force concerning timbering and packing at Courrières is given in Appendix V. The precautions enjoined by these rules are said to be rigorously enforced, the officials themselves being fined if the rules are not strictly carried out.

These regulations apply to all the seams worked at the Courrières Collieries. As regards supervision, we were told that in a pit employing 800 persons there was one chief fireman or overman, six firemen, and six assistant firemen.

The main point requiring attention, and the one which, in the opinion of the Courrières engineers, most largely conduces to the prevention of accidents, is that supports must be put in as soon as there is room, and that under no pretext may the timbering be delayed "until a more convenient season," as is so often the case in British collieries.

We learnt from M. Fèvre, the Government Inspector of Mines, stationed at Arras, that systematic timbering is practically universal in the collieries of Northern France, and indeed in French collieries generally. With reference to the temporary iron bars (*allonges*, Fr.), such as are used at Courrières, we found that the use of temporary supports in advance of the permanent timbering is not confined to the Courrières collieries, as we had the opportunity of seeing at one of the collieries belonging to the Lens Company small steel girders in general use for precisely the same object; these light and handy steel girders are a great improvement on the square iron bars. M. Reumaux, the Director-General of the Lens Company, and one of the foremost mining engineers of France, has kindly supplied an account, which we have translated, and which, with his permission, we reproduce in extenso. (Appendix IV.) It is important to recollect in reading M. Reumaux's conclusions that the Lens Company is the second largest in France, employing more than 11,000 persons, and having an output of 3,000,000 tons a year; his opinion, therefore, must carry great weight, and when he tells us that accidents from falls of roof have diminished by one-half where the small steel girders (corresponding to the iron bars of Courrières) have been introduced, and that he proposes gradually to enforce their use throughout his collieries, it would be difficult to obtain stronger testimony in their favour.

M. Fèvre, the Government Inspector of Mines, also spoke strongly in favour of the system of temporary iron bars as practised at Courrières and Lens.

Excellent timbering may, of course, be seen at home; but the important difference is that at Courrières the roof is regularly and at all times "close timbered"; whereas in this country, under similar roofs, the timbering is generally left to the discretion of the workmen, and is seldom so close, and is rarely fixed as soon as possible. It is only by adopting and enforcing some regular system of propping that it is possible to ensure the necessary supports being put in without dangerous delay.

The use of poles or planks, and in some few cases iron bars, driven forward in advance of timber sets, and termed "spiling," "spilling," "piling," "poling" or "forepoling," is an old and well-known process for driving through loose ground; but the Courrières system of pushing forward temporary iron bars in all working places as a preliminary to the permanent timbering is not practised in this country, so far as we are aware.

4. STATISTICS OF ACCIDENTS FROM FALLS OF ROOF AND SIDE.

The following statistics concerning the fatal accidents from falls of roof and side at Courrières during the past thirty years have been kindly supplied to us by M. Lavaurs, the Director of the Courrières Collieries, and he told us that the statistics included all deaths from falls of roof or side in all parts of the mine.

Table 1.

Table 1.
Courrières Collieries.

Year.	Death-rate from falls of roof and side.		Year.	Death-rate from falls of roof and side.		Year.	Death-rate from falls of roof and sides.	
	Per 1,000 persons employed below ground.	Per 1,000,000 tons of coal raised.		Per 1,000 persons employed below ground.	Per 1,000,000 tons of coal raised.		Per 1,000 persons employed below ground.	Per 1,000,000 tons of coal raised.
1870.....	0·87	3·21	1880.....	0·53	1·75	1890.....	0·00	0·00
1871.....	1·77	6·87	1881.....	0·00	0·00	1891.....	0·30	0·79
1872.....	0·00	0·00	1882.....	0·00	0·00	1892.....	0·27	0·71
1873.....	1·34	5·13	1883.....	1·25	3·53	1893.....	0·00	0·00
1874.....	0·60	2·57	1884.....	0·00	0·00	1894.....	0·26	0·66
1875.....	0·60	0·00	1885.....	0·00	0·00	1895.....	0·60	0·60
1876.....	0·53	2·50	1886.....	0·00	0·00	1896.....	0·23	0·62
1877.....	0·58	2·69	1887.....	0·38	1·03	1897.....	0·22	0·60
1878.....	1·13	4·60	1888.....	0·36	0·91	1898.....	0·00	0·00
1879.....	1·12	4·37	1889.....	0·00	0·00	1899.....	0·18	0·52
Average...	0·76	3·13	Average..	0·24	0·70	Average..	0·15	0·39

The general averages for the thirty years mentioned in Table 1 are 0·29 per 1,000 persons, and 0·87 per 1,000,000 tons.

With the object of making a comparison between the Courrières figures in Table 1 and similar statistics for this country, we have prepared four tables (Nos. 2 to 5). Table 2 gives the death-rates from falls per 1,000 persons employed below ground for the whole of the United Kingdom. Table 3 gives the death-rates from falls per 1,000,000 tons of mineral raised for the whole of the United Kingdom. In the case of Table 4, in order to make the basis of calculation as wide as possible, we have taken the colliery companies employing the largest number of persons underground in each inspection district; whilst Table 5 gives the death-rates at the collieries of the companies employing more than 1,000 persons below ground, which show the most favourable results in each inspection district. Unfortunately the outputs of individual collieries are not given in our mineral statistics, and consequently it is impossible, from the information published in the official Blue Books, to calculate the death-rates per 1,000,000 tons raised.

Table 2.
United Kingdom.—Coal Mines Regulation Act.

Death-rates from Falls of Roof and Side per 1,000 persons employed below ground.

Year.	Inspection District.													Average for the United Kingdom.
	1	2	3	4	5	6		7	8	10	11	12	13	
	East Scotland	West Scotland.	New-castle.	Durham.	York-shire and Lincoln-shire.	Man-chester.	Ireland.	Liver-pool.	Midland.	North Stafford-shire.	South Stafford-shire.	South Western.	South Wales.	
1895	·89	·70	·46	·66	·54	·97	...	·97	·33	·84	1·27	·89	1·08	·75
1896	·80	·98	·66	·55	·54	·78	...	1·05	·51	·99	1·05	·76	1·01	·76
1897	1·00	·97	·82	·83	·71	·90	...	1·07	·51	·74	·78	1·01	1·07	·86
1898	·66	1·00	·38	·79	·68	1·29	1·40	1·19	61	·89	·73	·61	·73	·76
1899	·81	·64	·65	·91	·48	·90	2·73	·82	·62	·79	·84	·63	·98	·75
Average for 5 years	·83	·88	·59	·75	·59	·96	·82*	1·02	·52	·85	·94	·78	·97	·78

* Mining in Ireland is on a small scale.

Table 3.
United Kingdom.—Coal Mines Regulation Act.

Death-rates from Falls of Roof and Side per 1,000,000 tons of Mineral (mainly Coal) raised.

Year.	Inspection District.													Average for the United Kingdom.
	1	2	3	4	5	6		7	8	10	11	12	13	
	East Scotland.	West Scotland.	New-castle.	Durham	York-shire and Lincoln-shire.	Man-chester.	Ireland.	Liver-pool.	Midland.	North Stafford-shire.	South Stafford-shire.	South Western.	South Wales.	
1895	2 11	1 69	1 30	1 45	1 67	3 06	...	3 02	97	2 28	2 79	3 12	3 50	2 11
1896	1 75	2 27	1 78	1 17	1 59	2 32	...	2 98	1 42	2 59	2 22	2 43	3 25	2 03
1897	2 14	2 23	2 12	1 71	2 07	2 64	...	3 05	1 34	1 88	1 55	3 10	3 27	2 23
1898	1 42	2 51	94	1 61	1 86	3 62	7 30	3 11	1 54	2 17	1 43	2 52	2 96	2 00
1899	1 75	1 51	1 66	1 83	1 31	2 50	15 23	2 16	1 51	2 01	1 73	1 80	2 78	1 87
Average for 5 years.	1 83	2 04	1 56	1 57	1 69	2 83	4 43*	2 86	1 37	2 18	1 93	2 57	3 15	2 05

* Mining in Ireland is on a small scale.

Table 4.

Deaths from falls of roof and side at the Collieries belonging to the Companies which employ the largest number of persons under ground in each Inspection District under the Coal Mines Regulation Act, during the five years, 1895-1899.

Number and Name of District.	Name of Colliery Company.	Average Number of Persons Employed below ground during the five years.	Deaths from Falls of Roof and Side during the five years.			Average Annual Death-rate from Falls of Roof and Side per 1,000 Persons Employed below ground
			Roof.	Side.	Total.	
1. East Scotland	The Fife Coal Co., Ltd.	3,026	10	3	13	0·86
2. West Scotland.....	William Baird & Co., Ltd.	6,470	22	6	28	0·87
3. Newcastle	The Harton Coal Co., Ltd.	3,690	9	1	10	0·54
4. Durham	The Lambton Collieries, Ltd.	7,119	25	5	30	0·84
5. Yorkshire and Lincolnshire	J. and J. Charlesworth, Ltd.	3,520	14	4	18	1·02
6. Manchester	The Bridgewater Trustees	2,933	10	4	14	0·95
7. Liverpool	Wigan Coal and Iron Co., Ltd.	3,915	12	1	13	0·66
8. Midland	The Staveley Coal and Iron Co., Ltd.	3,689	8	1	9	0·49
10. North Staffordshire	The Shelton Iron, Steel, and Coal Co., Ltd	1,628	2	2	4	0·49
11. South Staffordshire	The Cannock and Rugeley Colliery Co.	1,414	1	...	1	0·14
12. South Western	J. Lancaster & Co., Ltd.	2,957	10	4	14	0·95
13. South Wales.....	The Ocean Coal Co., Ltd.	6,390	16	9	25	0·78

Table 5.

Deaths from falls of roof and side at the Collieries belonging to the Companies employing not less than 1,000 persons under-ground, which show the lowest death-rate in each Inspection District under the Coal Mines Regulation Act during the five years, 1895-1899.

Number and Name of District.	Name of Colliery Company.	Average Number of Persons Employed below ground during the five years.	Deaths from Falls of Roof and Side during the five years.			Average Annual Death-rate from Falls of Roof and Side per 1,000 Persons Employed below ground.
			Roof.	Side.	Total.	
1. East Scotland	Lochgelly Iron and Coal Co., Ltd.	1,254	1	1	2	·32
2. West Scotland.....	Summerlee and Mossend Iron and Steel Co., Ltd.	1,030	1	...	1	·19
3. Newcastle.....	Mickley Coal Co., Ltd.....	1,444	1	...	1	·14
4. Durham.....	Londonderry Collieries, Ltd.	3,367	4	...	4	·24
5. Yorkshire and Lincolnshire	Barrow Hematite Steel Co.....	1,217	1	1	2	·33
6. Manchester	Hulton Colliery Co., Ltd.	1,332	1	...	1	·15
7. Liverpool	Garswood Coal and Iron Co., Ltd.....	2,023	4	1	5	·49
8. Midland	Linby Colliery Co., Ltd.	1,034	1	...	1	·19
10. North Staffordshire	R. Heath and Sons, Ltd.	1,623	1	1	2	·25
11. South Staffordshire.....	Cannock and Rugeley Colliery Co., Ltd.	1,414	1	...	1	·14
12. South Western	Powell's Tillery Steam Coal Co.	1,586	...	...	4	·50
13. South Wales	Great Western Collieries Co., Ltd.	2,073	5	...	5	·43

Tables 2 and 3 show that over a period of five years the average death-rate from falls of roof and side at the mines under the Coal Mines Regulation Act was ·78 per 1,000 persons employed below ground, and 2 persons per 1,000,000 tons of mineral raised.

From Table 4 we learn that the death-rates at the largest collieries of each district vary from 0·14 to 1·02 per 1,000 persons employed below ground.

In Table 5 it is satisfactory to find that three English Companies, viz. :—Mickley Coal Co., Cannock and Rugeley Co., and Hulton Colliery Co., show results as favourable as these of Courrières; but none of these companies approach Courrières in the number of persons employed below ground, nor do the statistics cover so long a period. The reason for taking a quinquennial and not a decennial period in Tables 4 and 5 lies in the fact that the British Blue Books did not give the number of persons employed at individual mines until the year 1894.

In Appendix VI we have given the corresponding figures for the coal-mines of France, Prussia, Illinois and Pennsylvania.

5. CONCLUSIONS.

The conclusions we have arrived at may be summed up as follows :—

(1.) The diagrams printed in the extract of the "General Report for 1899," which has been distributed among the collieries of this country, fairly represents the timbering as it is done day by day at Courrières, under the worst roofs; and the statistics given in that report are based upon data exactly similar to those relating to the statistics of falls of ground in this country.

(2.) The system of supporting the roof at the Courrières collieries may be divided into two parts, viz. :—

- Systematic timbering, with the timber inserted as soon as there is room for it.
- The use of temporary iron bars to support the roof in advance of the last "setting" of timber until there is room for another "setting."

The first-named part of the system may be practised without the second. Both parts of the system necessitate the use of timber "bars" in all cases. Single posts with a "lid" or "head tree" do not enter into this system at all. The use of the temporary iron bars requires that the timber "bars" must be set parallel to the face of work.

We quite believe that the Courrières system, if rigidly applied, would result in the prevention of a large proportion of the accidents by falls which might otherwise occur. The worse the roof and the greater the liability to falls, the more valuable the system would prove, and it would further prevent many of the accidents by falls which occur where there is no appearance of danger. The extra cost involved by the adoption of the Courrières system would be repaid in part by diminishing the number of falls, and so saving not only the cost of compensation for injuries, but also the cost of labour for repairs, as many falls occur without any one being injured.

(3.) The immunity from accidents at Courrières is not by any means due to naturally favourable conditions of the roof, but results chiefly from the extreme care taken in supporting it. The Courrières roof which we saw was certainly not good, and the high degree of safety attained is the strongest possible argument in favour of "systematic timbering."

(4.) We agree with the emphatic opinions expressed by the French engineers as to the necessity of enforcing not only systematic timbering, but also the setting of the timber immediately the distance fixed by regulations has been attained.

(5.) We are distinctly of opinion that more supports are fixed at Courrières to support the roof than is generally the case under similar roofs at home.

Though

Though it was no part of our mission to make a general study of the methods of mining in the Pas-de-Calais, and, indeed, the time at our disposal was quite insufficient for such a task, we could not help being impressed by many excellent arrangements for the safety and welfare of the workmen, both at Courrières and at Lens. We were also much struck by the neatness and order which prevailed everywhere, and the excellent cottages and gardens for the workmen.

Institutions have been founded to provide assistance to the workpeople in case of sickness, military service, and accidents, and to give them old-age pensions. These institutions are now worked in accordance with the laws of 29th June, 1894, and 9th April, 1898. Last year the contributions of the Courrières Company to these funds amounted to more than £21,000. It contributes to the education of the children of its workmen by founding schools or by subscriptions to public schools, and a church also was built in an outlying village. Last year the Company expended for these purposes more than £2,400. House-fire coal is supplied free to workmen who are heads of families, and to schools and charitable institutions, the value thereof in 1899 exceeding £6,500.

In conclusion, we have to tender our most grateful thanks to M. Lavaurs, Director, and M. Bar, Chief Engineer, of the Courrières Company, to M. Reniaux, Director-General, M. Lafitte, Chief Engineer of the underground workings, and M. Havard Duclos, Manager of the No. 6 Pit of the Lens Company, for their kind reception, and for much valuable information which they one and all so readily afforded to us, and finally to M. Fèvre, Government Inspector of Mines, who gave us many useful explanations.

We have the honor to be,

Sir,

Your obedient servants,

C. LE NEVE FOSTER,

HENRY HALL,

W. N. ATKINSON,

JOHN GERRARD.

The Right Hon. C. T. Ritchie, M.P.,

His Majesty's Principal Secretary of State, Home Office.

APPENDIX I.

Output of the Courrières Collieries since the Formation of the Company.

Year.	Output.	Year.	Output.	Year.	Output.	Year.	Output.
	metric tons.		metric tons.		metric tons.		metric tons.
1851	4,000	1864	193,476	1877	370,512	1890	1,226,093
1852	7,000	1865	211,832	1878	434,457	1891	1,264,226
1853	8,300	1866	227,027	1879	457,461	1892	1,397,985
1854	21,000	1867	225,371	1880	571,610	1893	1,306,161
1855	18,600	1868	275,222	1881	674,588	1894	1,497,306
1856	22,400	1869	310,727	1882	756,841	1895	1,552,936
1857	80,600	1870	314,217	1883	850,551	1896	1,600,520
1858	83,100	1871	290,756	1884	790,158	1897	1,670,463
1859	83,000	1872	346,639	1885	788,722	1898	1,791,280
1860	80,300	1873	387,844	1886	858,711	1899	1,930,868
1861	102,100	1874	387,579	1887	964,484	1900	*2,050,000
1862	117,036	1875	449,614	1888	1,093,588		
1863	152,432	1876	398,112	1889	1,188,675		

* Probable.

APPENDIX II.

Timber employed at the Courrières Collieries.

Kind of Timber.		Length.		Circumference in the middle of the piece.		
		metres.	ft. in.	centimetres.	ft. in.	ft. in.
Props for working places (<i>Bois de tailles</i>)		1.00	3 3½	28 to 32	0 11	to 1 0½
		1.10	3 7	do	do	do
		1.20	3 11	do	do	do
		1.30	4 3	do	do	do
		1.40	4 7	32 to 36	1 0½	to 1 2
		1.50	4 11	do	do	do
		1.60	5 3	do	do	do
		1.70	5 7	do	do	do
		1.80	5 11	36 to 41	1 2	to 1 4
		2.00	6 6½	do	do	do
Timber for roadways (<i>Bois de voies</i>)		2.20	7 2½	41 to 46	1 4	to 1 6
		2.50	8 2½	do	do	do
	Pine	1.60	5 3	41 to 46	1 4	to 1 6
		1.80	5 11	do	do	do
		1.50	4 11	36 to 40	1 2	to 1 4
	Oak	1.50	4 11	40 to 50	1 4	to 1 8
		1.80	5 11	36 to 40	1 2	to 1 4
		1.80	5 11	40 to 50	1 4	to 1 8
	Pine.....	2.00	6 6½	do	do	do
		2.20	7 2½	do	do	do
Light poles (<i>Bois de Mine or Queus</i>)		2.50	8 2½	do	do	do
	Pine.....	1.20	3 11	14 to 20	0 5½	to 0 7½
		1.20	3 11	12 to 20	0 4½	to 0 7½
		1.20	3 11	12 to 20	0 4½	to 0 7½
	Oak	1.20	3 11	20 to 24	0 7½	to 0 9½
		1.50	4 11	18 to 20	0 7	to 0 7½
		1.50	4 11	20 to 24	0 7½	to 0 9½
	Alder, hornbeam, &c....	3.00	9 10	22 to 26	0 8½	to 0 10½
		4.00	13 1	do	do	do
	"Bars" (<i>Railloiges</i>)					
Poles (<i>Perches</i>)	{ 5 marl s.					
Oak saplings (<i>Chéniaux</i>).	{ 4 "					
Pine trees (<i>Sapins</i>).						

APPENDIX III.

The following notes relating to the timber employed at the collieries of the Liévin Company, whose concession adjoins the properties of the Lens and Courrières Companies, are translated from a valuable pamphlet* written for the Paris Exhibition :—

Timber.—The kinds of timber employed for supporting purposes are as follows :—

Pine, hornbeam, aspen, alder, and oak. These different kinds of timber are employed in the following proportions :—

	Per cent.
Pine	50
Hornbeam	15
Aspen	10
Oak	10
Alder	5
Sundries	10

The timber employed at the working faces is generally pine ; but the “bars” (*rallonges* or *rallongues*, Fr.) and the light poles (*queues*, Fr.) are always of grey timber, on account of the comparative weakness of pine of small diameter. Oak is employed in roadways required for a long time, and especially for the horizontal “bars.”

Whence obtained.—The grey timber† comes principally from the eastern Departments, and especially the Marne, the Haute-Marne, and the Meuse.

The pine timber‡ is furnished by Normandy, the Department of the Landes, and also in great part by Russia.

Supplies.—The nature and size of the pieces, although varying somewhat, are about as follows :—

10 per cent.—Barked oak, partly in poles of their full length, partly in props of fixed lengths, and 1 foot 7½ inches to 2 feet 3½ inches (0·m. 50 to 0·m. 70) in circumference.

35 per cent.—Props of fixed lengths, and from 14 inches to 2 feet (0·m. 36 to 0·m. 60) in circumference, called “timber for roadways” (*bois de voie*, Fr.), and in the following proportions :—

Pine	$\frac{3}{4}$
Grey timber	$\frac{1}{4}$

15 per cent.—Props of 7¾ inches to 13¾ inches (0·m. 20 to 0·m. 35) in circumference, called “props for working places” (*bois de taille*, Fr.), nearly all of which are of grey timber.

25 per cent.—“Bars” (*rallonges*, Fr.) and light poles (*queues*, Fr.), almost exclusively composed of grey timber. The rest is composed of poles of their full length, of which it is necessary to have a stock in reserve in order to supply pieces of exceptional dimensions, which are wanted daily, or in order to cut from them the regular sizes which have run short.

13 per cent.—Poles, as follows :

Pine, from 13¾ inches to 1 foot 9½ inches in circumference in the middle	$\frac{9}{10}$
Grey timber, from 9¾ inches to 1 foot 9½ inches in circumference in the middle	$\frac{1}{10}$

2 per cent.—Poles of grey timber, called “poles of one or two marks.”

Total, 100

The preference given to grey timber, in the case of pieces of small diameter, is due to the natural output of the coppices, which are cut before the timber has grown to a large size. It is justified by another consideration, which apparently is abnormal, but which is the result of long observation. The grey timber of small diameters of any given kind is proportionately stronger than the large props of the same kind ; the small props also decay less rapidly than the large ones. From this last point of view, however, grey timber of small diameter is inferior to pine, which will stand prolonged storage without deterioration.

Purchases.—The Liévin Company buys its timber in the following manner :—

1st. Poles, called “poles of one or two marks,” at so much per pole.

2nd. Poles of larger dimensions and oak saplings, at so much per actual cubic metre. The cubic contents are determined by the length of each pole multiplied by the area of the section in the middle of this length.

3rd. Pieces sawn into lengths, at prices based on the price per cubic metre. These prices are reduced to a price per piece according to the mean cubic contents of each category, in order to simplify the receipts and the regulations.

Conditions of the supplies.—The timber is delivered upon the railway waggons in the arrival station at the cost of the timber merchant.

The timber is received and verified upon the places where it is stacked. It should be timber felled during the preceding winter.

After the month of May, deliveries may be made during the following six months for grey timber, eight months for pine, ten months for oak.

The following are excluded :—

Timber in a bad state of preservation on arrival.

Crooked poles unfit for being cut up into props.

Crooked props exceeding the allowed maximum of deviation of 1½ inches per yard (4 centimetres per metre).

Props which have been cut from branches of trees, or from tops of trees which have had their branches cut off.

As the removal of the bark is necessary in order to insure a longer life to the timber, this condition is imposed upon the seller.

The grey timber with a rough surface is smoothed as much as possible, so that half at least of the bark has been taken off ; resinous timber, which is naturally smoother, has to have the bark completely removed.

APPENDIX IV.

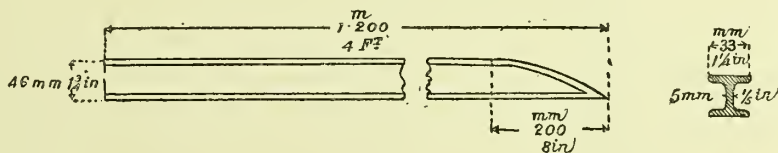
NOTE ON THE EMPLOYMENT OF IRON BARS AT NO. 6 PIT, BY M. REUMAUX, DIRECTOR-GENERAL OF THE LENS COLLIERIES.

After many years of trials in different kinds of ground and under different conditions we have adopted and rendered compulsory at No. 6 pit the employment of iron bars (*allonges*, Fr.) in driving roadways and in getting coal.

Timbering Working Places.

The iron bars which we use in the working places are formed of double T iron about 4 feet (1·20m.) long, as is shown in the sketch below. The front edge is made by heating that end of the bar and flattening it out with a hammer until the two flanges are welded together (Fig. 1).

FIG. 1.



This bar weighs 11 lb. (5 kilogrammes) ; in other words, it is handy, and it costs less than 1s. 7d. (2 francs).

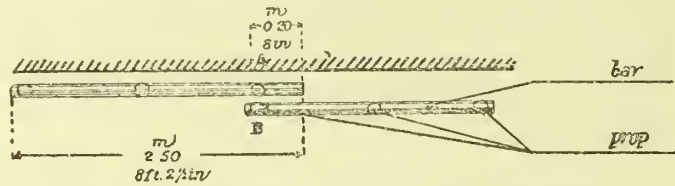
* *Exposition Universelle. Société Houillère de Liévin. Notice historique et descriptive.* Douai, 1900, p. 58 and p. 106.

† The term “grey timber” is applied to all bone-grown timber other than resinous timber ; poplar and lime are the only kinds which are excluded, as their strength is small. Beech, although strong, is only allowed in small proportion on account of its being liable to break suddenly.

‡ Scotch fir (*Pinus sylvestris*), maritime pine (*Pinus maritima*), and sometimes larch.

The manner in which a working place is timbered is as follows :—We will take the time when a workman is about to excavate coal ; we shall then see that along the working face immediately under the roof there are a series of timber “bars” (*rallonges*, Fr.), each supported by three upright props, the timber “bars” are 8 feet 2½ inches (2.50m.) long, and should overlap sufficiently so that the last, A for instance, should be in the same plane at right angles to the face as the last bar B of the preceding set (Fig. 2).

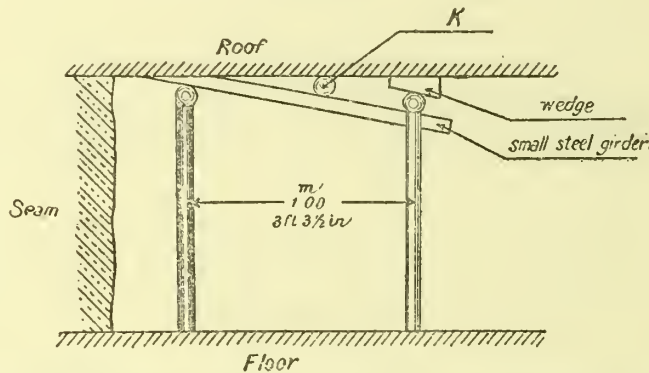
FIG. 2.



The workman begins to cut away the coal under the roof in front of him, and would therefore soon find himself under ground without support were it not for the iron bar.

As soon as he has uncovered 1 foot (0.30m.) of roof he pushes his iron bar between the roof and the last wooden “bar” (*rallonge*) which has been put up ; but in order to do this he must have left room for the iron bar (*allonge*) to pass ; and we have, therefore, been obliged to require that above each prop supporting the timber “bar” the workman should put in a big wooden wedge, as he would have to do in any case in order to tighten up the timber “bar” properly (Fig. 3).

FIG. 3.



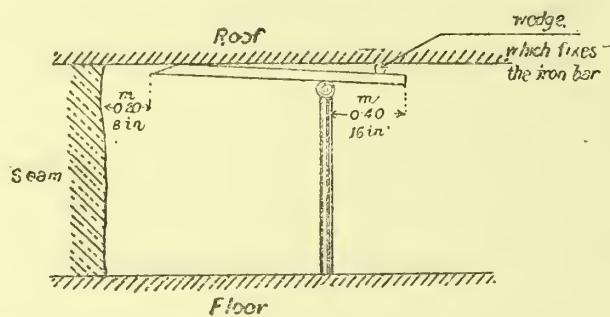
From the figure above a first reason for the chisel-like end of the iron bar will become apparent. It is evident if it did not exist that the bar would not bear fully against the roof in the first part of the process of excavation ; it is with this object that the workman places his iron bar with the web vertical and the flattened edge upwards.

As soon as part of the roof has been uncovered by the removal of the coal, the workman should push on his iron bar and fix it against the roof by means of the wedge K, and we usually require that the edge of the bar should not be more than 8 inches (0.20m.) from the face.

The workman is provided with three iron bars which he drives out in front of him at a distance of 20 inches (0.50m.) one from the other.

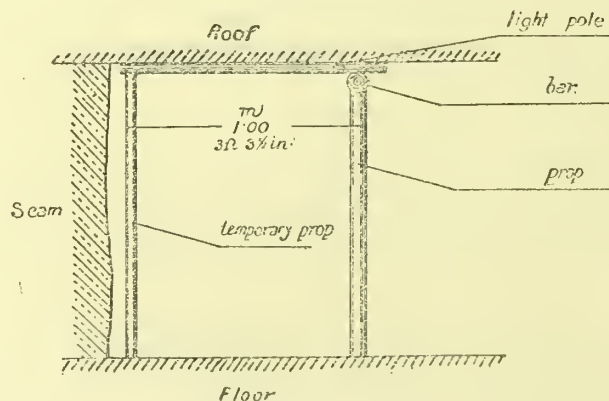
When he has excavated 3 feet 3½ inches (1 metre), the iron bars still have 16 inches (0.40m.) projecting behind the timber “bar,” and will be firmly fixed against the roof by the wedge (Fig. 4).

FIG. 4.



The workman now passes a light pole (*queue*, Fr.) by the side of the iron bar, pushes it on to the face of the coal, and supports it by a temporary prop (*timber*, Fr.) (Fig. 5).

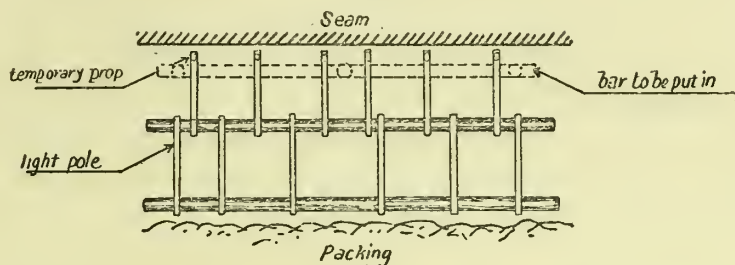
FIG. 5.



He does the same by the side of his other two iron bars, and then withdraws them all three, and moves sideways in order to continue his work of excavation.

Consequently, when this work is finished, he has behind him a timber "bar" over which have been passed six light poles (*queues*, Fr.) held up by six temporary props (Fig. 6).

Fig 6.



He then goes and fetches a timber "bar," and, after having firmly supported it by the three regulation props, he takes down the six temporary props (*tintiats*, Fr.); he will, therefore, have completed his excavation without having once been under any unsupported roof.

We may here remark that fixing the length of the iron bar at 3 feet 11½ inches (1·20 m.) is justified by the reasons given above; that is to say, that there is always a heel or butt end of 16 inches (0·40 m.) for fixing it firmly, and that the chisel edge is useful, not only for supporting the first few inches of roof which have been laid bare, but also for enabling the iron bar, 3 feet 11½ inches in length (1·20 m.), to be put in and drawn out easily between the two rows of parallel timber "bars," 3 feet 3½ inches (1 metre) apart.

The description given above is of a purely diagrammatic character, and has simply for object to explain the principle on which the iron bars are employed; but this system lends itself with elasticity to all the applications required at the working faces, whether they advance to the full rise or along the level course (*taille montante* or *taille chassante*, Fr.), and whether the ground be good, bad, or indifferent.

Timbering Roadways.

When making a roadway by cutting away (*ripping*) the roof after the excavation of the coal, we likewise employ iron bars. The workmen, called "brushers" (*coupeurs de mur*, Fr.), have three square iron bars, 1½ inches (4 centimetres), on the side; they are very heavy, and we propose to replace them before long by iron bars of the same kind as those employed in "getting"; the only difference will be in their length. Experience has shown us that the iron bars employed by the "brusher" should be 5 feet long (1·50 m.).

After the shot has been fired, the manner of using them is precisely the same as before. The brusher passes his three iron bars over the last timber "bar" (*bille*, Fr.) and pushes them on in proportion as he breaks down the ground, and in such a manner that he is always protected.

As other conditions of safety, we require that after having put in the next setting of timber, the brusher should timber up the face of the "canch," and should connect the "bar" supporting this "canch" (*rallonge d'abindage*, Fr.) by strong stretchers or struts (*poussards*, Fr.) to the last set of timber in the completed roadway. Lastly, on arriving in the morning, the workman should put up a supplementary "bar" under the "canch," and 8 inches (20 cm.) in advance of the one (*rallonge d'abindage*, Fr.) set the day before.

Results.—The experience of several years has proved that the employment of iron bars has reduced in very notable proportions the accidents arising from falls of roof or side in the working places. The reduction in the number of persons injured from this cause is certainly more than 50 per cent.

APPENDIX V.

EXTRACT FROM THE OFFICIAL REGULATIONS FOR THE COURRIERES COLLIERIES.*

Part III.

Getting coal and timbering the working faces; heightening the roadways (ripping) and timbering them.

Article XIV.

Working miners employed in getting coal should, before everything, pay attention to the state of solidity of the ground, and the condition of the timbering. Before beginning their work, they must examine whether the timbering placed before their arrival has been disturbed accidentally, and before doing any other work, they must remedy anything which appears to be defective.

The timbering must always be sufficiently strong, and be kept as close as possible to the working face.

It must follow the "getting" immediately, and must be placed for the whole height or width of the face before the workmen go away.

As it is impossible to draw up precise rules with regard to the precautions to be observed in timbering the working places, the workmen must obey implicitly all measures of safety prescribed by the fireman (porion, Fr.) for this purpose.

As this article does not enter into details of the precautions to be taken, and simply orders the workmen to conform to the orders of their superiors, the latter are consequently obliged to prescribe in each case the means to be employed for working in full safety. For that purpose, while making use of the practical knowledge which they should possess, they must observe the following rules, which are of a general character:—

The timbering of the working faces is done with "bars" (*rallonges*, Fr.) 3 feet 3½ inches (1 metre) apart, and supported by props, also never more than 3 feet 3½ inches (1 metre) apart. The light poles (*queues*, Fr.) which lie on the "bars" in all the working faces should overlap each "bar" by 3 inches (7 to 8 centimetres), and should be 20 inches (50 centimetres) apart on an average.

For supporting the "bars" (*rallonges*, Fr.) a niche or recess (*hitch*, Cornwall, *potia*, Fr.) must never be employed in place of a regular prop; and unless the seam is very hard, the light poles (*queues*) also must be supported by temporary props (*bois d'attente* or *tintiats*, Fr.).

The "bar" must always be made tight by a light pole (*queue*) or a wedge placed against the roof vertically above the prop.

As soon as a piece of timber breaks, it must be replaced; if a "bar" bends or crushes, it must be immediately strengthened by supplementary props, or a second "bar" must be put up alongside it.

The "bars" must be put up as soon as possible, and as soon as ever the face has advanced far enough; while waiting to make the timbering complete, the roof in front of the last "bar" (*rallonge*, Fr.) must always be supported by temporary iron bars (*allonges*, Fr.).

These temporary iron bars (*allonges*) are part of every workman's set of tools; each man ought to have three, and to make constant use of them, both in "getting" the coal as well as in heightening the roadways (*ripping*); they ought not to be drawn out and removed to another place until the regular timbering is completed.

When iron girders are used as "bars," there must always be one or more provisional timber "bars" preceding the last iron girder, so that it may be possible to use the ordinary temporary iron bars (*allonges*).

* *Mines de Courrières. Recueil des Mesures prescrites en vue d'assurer la sécurité du personnel dans les travaux du fond. Règlements officiels et instructions particulières.*—Henin-Liétard, 1904, p. 32.

Under no pretext may a timber prop be removed from the working face until some other means of support of equal strength has been put in.

If for some reason it is necessary to set a "bar" more than 3 feet 3½ inches (1 metre) from the next, an extra large one must be put in. This observation applies specially in case of roadways used by the men engaged in packing or stowing.

In seams consisting of several layers or bands, which are excavated successively in descending order, or in very thick seams, the workmen, unless specially ordered to do differently, must begin cutting away the seam by the roof; they must then at once put in the temporary iron bars, light poles, and timber "bars" (*allonges*, *queues*, and *rallonges*, Fr.), and support them by provisional props, which must be successively replaced by final props when the lower layers are removed. To prevent these long props from bending they must be stayed by stretchers or struts (*poussards*, Fr.) tightly fixed half-way up each prop. In this case "bars" of double strength (*lourgerons*, Fr.) must be employed.

Before commencing to undercut (*hole*), the coal, the face must first be wedged up against the props supporting the last "bar" (*rallonge*); if the seam is thick, oblique stretchers or struts (*poussards*) are put in resting against the foot of the props behind, and when a groove (*holing*) has been cut, a sprag (*piloteur*, Fr.) is at once put in with a piece of plank (*liti*), or a wide wedge above it; as the "holing" is cut deeper, fresh sprags (*pilotes*) are put in.

All these stretchers and sprags (*poussards* and *pilotes*) are at most 3 feet 3½ inches (1 metre) apart.

In seams dipping more than 10°, holing upwards is forbidden; in seams dipping very steeply, with the working faces advancing on the level course (*tailles chassantes*, Fr.), the holing must begin at the upper end of the face, and the coal must be worked away from the upper end towards the lower end.

When a face is being worked along a part where the roof has fallen, the timbering must always be doubled on the side of the fall. Whenever the roof or the floor has to be "ripped" in order to make a roadway, the timbering must be doubled along the edge of the adjacent part of the working faces.

Every workman who leaves his working face without having finished his timbering or leaves the vein "holed" without any sprags must be punished.

No timber must be employed for support unless it is of good quality and of the usual dimensions. If through carelessness timber which does not satisfy these conditions has been sent down, it should be put aside, and the foreman "fireman" (*porion*, Fr.), on being told, should at once make inquiries concerning the breach of the regulations, and take the necessary steps to prevent such a thing from happening again.

Article XV.

In heightening the roadways (ripping) the workman must never take out the timber supporting the roof until he has made the sides safe.

The workmen who are packing the goaf shall keep inside the working faces, where the stones shall be thrown to them by the "brushers" (coupeurs de mur, Fr.), and they shall not stand under the roof which has been laid bare.

The parts of the working face which are to be converted later into roadways are timbered in the thickness of the seam with small "bars," generally of oak, supported by three props, each small bar is strutted against the last frame (*set*) and connected with the last bar of that frame by a set of light poles along the inclined roof.

The frames (*sets*) are placed at the regulation distance of 3 feet 3½ inches (1 metre) apart, and they are doubled in inclined seams worked with stowing.

The "bars" employed must be of oak or pine; if of the latter timber, they must bear a mark in order to distinguish them from the props for the working faces.

If pine "bars" more than 6 feet 6 inches (2 metres) long are employed, they must be supported by three props.

Not more than 6 feet 6 inches (2 metres) of roof may be ripped down at any one time. As soon as the first part has fallen, iron bars are pushed out from above the last timber "bar," and room is cut out for putting in a frame (*set*), without going beyond it. When the first frame has been put up, iron bars are run out from it so that the work may be completed without its ever being necessary to stand under an unsupported roof.

When the floor is ripped up, the final "bars" are put in from the first, and they are kept up by strong temporary "bars" and props placed longitudinally (*échelles*, Fr.) until their regular props can be put in finally.

In constructing steep inclined planes, the roof is cut down, as far as possible, by working downwards.

Stowing or Packing.

When the packers come into the working faces, they should find them perfectly secure. The foreman should give orders to all the workmen that if they notice that pieces of timber are wanting or broken, or observe any other signs of danger, they shall not begin their work without informing him, so that he may at once have the necessary propping carried out.

If the stowing is being done in an inclined seam, packed with waste brought in large trams (*tubs*) travelling along the top roadways, one of the precautionary measures to be observed is to put in longitudinal "bars" with props, in place of the props on the dip side of the frames.

In working places, with the seam dipping at an angle exceeding 25°, and even with a dip less than this if the thickness of the seam is great, a safety barrier of planks (*hourdage de garantie*, Fr.) is put up against the second set of props, independent of that against the first set of props or against the props on the rise side of the roadway.

Keeping the Roadways in Order, Fall of the Roof, "Drawing" the Timber.

The "fireman" (*porion*, Fr.) must keep himself informed by frequent and daily visits, as far as possible, about the condition of all the roadways in his district; he must see that repairs are executed if there is danger of a fall of roof or side, and especially when several frames (*sets*) are broken one after the other. He must see that the roadways are always kept sufficiently wide to prevent the mine waggons (*tubs*) from rubbing against the sides. He must stop the traffic and cause the workmen to leave the roadways and the working faces, where the roof is coming down in a manner causing anxiety. He must himself "sound" with the pick, which he must always carry, the sides of the roadways where the rock is left bare, and must at once give order to take down or to support any parts which he finds insecure. In roadways which are a little old, he must satisfy himself pretty often that the quality of the props and light poles (*queues*, Fr.) has not deteriorated, and he must arrange that no gaps are left without timber through which large stones might fall.

The "brushers" (*raucheurs*, Fr.) must be prevented from widening their working places imprudently; unless the ground is very firm, they must not take away the timber from more than 3 feet 3½ inches (1 metre) at a time, and in every case the trammer (*hercheur*, Fr.) who is putting in the packing must be able to remain in a place which is timbered. At the end of the day's work provisional timbering must be put up for the whole width between the part which is packed and the part still remaining untouched.

In driving through heavy falls, none but experienced workmen must be employed, and they must protect themselves by stronger iron bars (*allonges*, Fr.) than usual, put up the frames (*sets*) at a distance of 2 inches (50 cm.) apart at the most, and connect them together by nailing on boards; the tops of the "bars" must be covered by a layer of faggots, if nothing better can be done, and the timber employed must be of large size and picked quality.

When earth has to be drawn out from a place where the roof has fallen in, the sides must first of all be timbered very firmly, and no rubbish must be drawn out save with a long rake, which will enable the workman to remain in the timbered part while doing his work.

It is always a miner and not a labourer who is charged with work of this kind.

None but special workmen shall be employed in "drawing" timber, and instructions how to work shall be given to them by a foreman; orders also shall be given to sacrifice any pieces of timber which cannot be removed without endangering the safety of the workmen.

In "drawing" timber from roadways, a prop must be put under the middle of each "bar," before removing the props at the side.

In the working faces one of the two following methods is employed, each having the object of leaving the timber-drawer under the protection of firm timbering.

If the seam is of medium thickness, a supplementary "bar" (*rallonge*, Fr.) is put up 20 inches (50 cm.) from the one to be "drawn." If the seam is thick, special tools with long handles are employed to cut the timber, "punch" it out, and rake in the pieces after they have fallen.

APPENDIX VI.
COAL MINES.

FRANCE.				PRUSSIA.				ILLINOIS.			
Year.	Persons Employed Under-ground.	Deaths from Falls of Ground.	Death-rate per 1,000 Persons Employed Under-ground.	Year.	Persons Employed Below-ground.	Deaths from Falls of Ground.	Death rate per 1,000 Persons Employed Below-ground.	Year.	Persons Employed Under-ground.	Deaths from Falls of Ground.	Death-rate per 1,000 Persons Employed Under-ground.
1894 ...	96,367	51	·53	1895...	220,799	283	1·28	1895...	34,648	38	1·10
1895 ...	97,435	53	·54	1896...	229,556	264	1·15	1896...	33,175	41	1·24
1896 ...	99,928	66	·66	1897...	245,215	266	1·08	1897...	30,248	46	1·52
1897 ...	191,693	51	·50	1898...	264,586	340	1·29	1898...	31,602	43	1·36
1898 ...	105,395	71	·67	1899...	279,510	360	1·29	1899...	33,199	51	1·54
Average death-rate from falls of ground for 5 years			·58	Average death-rate from falls of ground for 5 years ...			1·22	Average death-rate from falls of ground for 5 years ...			1·34

ANTHRACITE AND BITUMINOUS COAL MINES TAKEN SEPARATELY.

PENNSYLVANIA.						
Year.	Anthracite.			Bituminous.		
	Persons Employed Below-ground.	Deaths from Falls of Ground.	Death-rate per 1,000 Persons Employed Below-ground.	Persons Employed Below-ground.	Deaths from Falls of Ground.	Death-rate per 1,000 Persons Employed Below-ground.
1894	87,626	190	2·27	73,551	156	2·12
1896	94,788	254	2·68	71,559	114	1·59
1897	95,812	205	2·14	73,426	111	1·59
1898	91,171	192	2·11	73,709	131	1·78
1899	92,223	226	2·54	74,933	163	2·18
Average death-rate			2·33	Average death-rate		1·84

ANTHRACITE AND BITUMINOUS COAL MINES TAKEN TOGETHER.

PENNSYLVANIA.				
Year.	Persons Employed Below-ground.	Persons Employed Above- and Below-Ground.	Deaths from Falls of Ground.	Death-rate per 1,000 Persons Employed Below-ground.
1894	161,177	225,712	355	2·20
1896	166,347	233,892	363	2·21
1897	162,238	236,110	316	1·87
1898	164,880	230,349	323	1·96
1899	167,156	232,038	389	2·33
Average death-rate from falls of ground				2·11

As miners are nearly always paid by contract in his State for getting coal, and as this usually includes the fixing of timber to ensure safety, the latter work is sometimes neglected, and the unfortunate anxiety to produce more coal at the expense of safety, often results in accidents.

In some collieries a more regular method of timbering might be adopted with advantage, and the regulation as to the spragging of coal should be enforced with more determination by colliery officials, who are sometimes induced, by a false idea of sympathy, to collude with workmen in a lax performance of the duties pertaining to their safety.

USE OF EXPLOSIVES.

ACCIDENTS with Explosives, classified according to their character or cause.

Character or Cause.	No. of Fatal Accidents.	No. of Deaths.	No. of Non-fatal Accidents.	No. of Persons Injured.
While conveying explosives	1	1
While thawing explosives
While charging or stemming holes—				
From sparks of lamp or candle.....	2	2
When using iron or steel tools
When using wooden, brass, or copper tools
Premature explosions—				
With squibs or straws
With safety fuse	2	2
Delayed explosions
Unramming shots	1	1
Blows from stones projected by shots.....	3	4
Sundries and unknown
Totals.....	9	10

LIST OF ACCIDENTS WITH EXPLOSIVES.

Registered No.	Date.	Name of Colliery.	Where situate.	No. killed.	No. injured.	Cause.
43	16 Feb.	East Greta	East Greta ....	....	1	Slight burns on left arm and chest by ignition of powder whilst unramming a missed shot. Breach of General Rule 12.
51	22 „	Lambton B.	Redhead .....	....	1	Tamped a charge of powder up in a hole 1 foot 10 inches deep in a back end, left rib of a 6 yard bord. Length of fuse, 2 feet. After lighting fuse, he took drills, &c., and placed them on the opposite side of the bord. He turned to retire to safety, but had stayed too long. The charge exploded and threw the coal (about a tubfull) across the bord. Portion of coal fractured his right leg below and above the ankle. Two props were also knocked out by the force.
76	22 March..	Lambton B.	Redhead .....	....	1	Preparing a charge for blasting in ent-through. He had one plug of powder in the hole, and half a plug lying on some coal. He was testing the reliability of a piece of fuse by firing it, when the sparks ignited the half-plug. Result, burns on arms, not serious. Off work 9 days.
132	30 July....	Brown's No. 4..	Minni .....	....	1	Accidentally passed light under powder-tin containing two pieces of cartridge of about 1 plug each, and ignited them, causing slight burns to right arm and right breast. With lamp on head, was reaching to get his clothes, and lamp came into contact with base of tin, said tin was hanging on a prop.
136	6 August..	Wickham and Bullock Island	Carrington ....	....	1	A shot was prepared and lit, when Simpson and his mate retired. Hearing a report, they assumed their shot had gone off, and went back into the bord, when their own shot exploded, and Simpson was struck on the leg by some of the falling coal. Injuries not serious.
188	13 Nov. ..	South Greta ..	Farley .....	....	1	Slight burns on hand by ignition of powder whilst retiring from firing a shot with superfluous cartridge.
189	14 „ ..	Northern Extended.	Teralba .....	....	1	Burns on hand and arm by ignition of powder whilst proceeding to charge a shot.
192	26 „ ..	Mount Kembla.	Mount Kembla. ....	....	2	Whilst Harold Biggers was in the act of lighting a shot in the bord, it exploded. Some coal was dislodged, and striking him caused a fracture of the jaw. His brother, Jas. Biggers, who was standing behind him received a severe cut on the head by a fragment of coal blown from the shot.
198	6 Dec.	Killingworth ..	Killingworth ..	....	1	Left hand burnt by explosion of powder, supposed to have been accidentally dropped in charging the hole and afterwards ignited by a spark emitted from fuse when the shot firer was lighting the fuse. Injured man was sitting a few feet away from the shot firer, who was at mouth of hole, which was a few inches from the floor.

The above Table shows 9 accidents by explosives, mostly the result of carelessness.

No. 43 was the result of a breach of General Rule 12, whilst attempting to unram a missed shot. For this offence a prosecution was instituted, and the offender fined 5s. and 4s. 10d. costs.

No. 51 was caused by a miner remaining too long at the shot after the fuse had been lit, with the result that he was struck by some of the coal brought down by the shot.

No. 76 was caused by the sparks from a fuse igniting a half-plug of compressed powder lying near.

No. 132 was caused by the light on Barr's head igniting half a plug of compressed powder, causing burns on right arm and right breast.

No. 136 was caused by the miner returning to his shot before it had exploded, the result being that he was struck on the leg by some of the falling coal, causing injuries.

No. 188 was caused by ignition of powder which the man was carrying in his hand whilst retiring from the shot.

No. 189 was caused by ignition of powder whilst the miner was proceeding to charge the shot.

No. 192 was probably caused by the injured man going back to a shot before it had exploded.

No. 198 was caused by a spark emitted from fuse exploding powder lying near.

It will be noticed that these accidents disclose considerable carelessness. The only one which happened where an authorised person had to fire the shot was the last, and this was probably due to the carelessness of the miner in having left some powder lying about. Much more care should be exercised by the workmen in the handling of powder, and the duty is imposed upon the officials of seeing that this is done.

BLASTING UNDERGROUND.

Little advance is being made in the State in the use of what is known as "permitted explosives," even in collieries known to give off firedamp; and this is a matter which should, in the interests of safety, receive more attention than it does from colliery managers.

The following is a copy of the last "Explosives in Coal-mines Order" issued by the Home Secretary in England:—

The accompanying paper is a new Order relating to the use of Explosives in Coal Mines, made by the Secretary of State in pursuance of Section 6 of the Coal Mines Regulation Act, 1896.

The Order *revokes all previous Orders under that section from the 1st November next*; and after that date the only explosives allowed in mines to which the Order applies will be those enumerated in the Schedule, viz.:—

Ammonite, Amvis, Aposite, Bellite No. 1, Bellite No. 3, Cambrite, Carbonite, Dahmenite A, Electronite, Faversham Powder, Kynite, Nobel Ardeer Powder, Nobel Carbonite, Pit-ite, Roburite No. 3, Saxonite, Special Bulldog, Stow-ite, Thunderite, Virite, Westfalite No. 1, Westfalite No. 2.

These are the explosives which, in previous Orders, appeared in the "Special List," with the addition of Westfalite No. 1, and Westfalite No. 2, which have passed the Special Test since the making of the last Order. All explosives which have not passed the test are, after 1st November, excluded from the permitted List in accordance with the notice given in the Home Office circular of 19th June last.

In the body of the Order, as distinguished from the Schedule, no change has been made—its terms are identical with those of the Order of 24th September, 1900, now revoked.

H. H. CUNYNGHAME.

Home Office, Whitehall, 1st October, 1901.

Statutory Rules and Orders, 1901.—No. 789.

THE EXPLOSIVES IN COAL MINES ORDER OF THE 1ST OCTOBER, 1901.

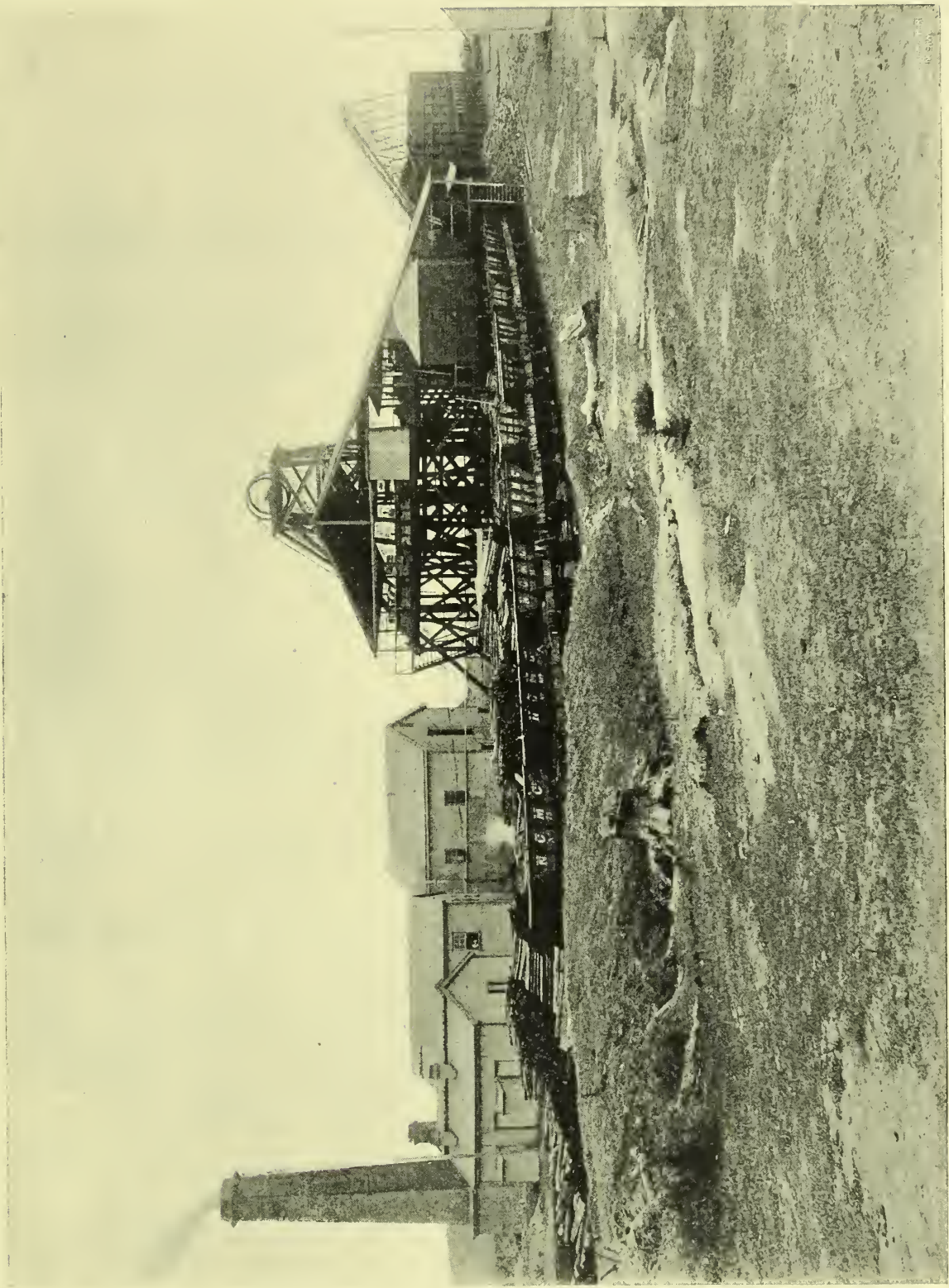
Whereas by Section 6 of the Coal Mines Regulation Act, 1896, it is enacted that a Secretary of State, on being satisfied that any explosive is, or is likely to become, dangerous, may by Order prohibit the use thereof in any mine or in any class of mines either absolutely or subject to conditions:

I hereby, in pursuance of the power conferred on me by the aforesaid section, make the following Order:—

Absolute prohibition of certain explosives in unsafe mines.

- 1.—(1) In all coal mines in which inflammable gas has been found within the previous three months in such quantity as to be indicative of danger, the use of any explosive, other than a permitted explosive as hereinafter defined, is absolutely prohibited in the seam or seams in which the gas has been found.
- (2) In all coal mines which are not naturally wet throughout, the use of any explosive, other than a permitted explosive as hereinafter defined, is absolutely prohibited in all roads, and in every dry and dusty part of the mine.

Conditional



THE NEWCASTLE COAL MINING COMPANY'S B PIT, MEREWETHER.
(General view.)

Conditional prohibition of other explosives in unsafe mines.

2. In all such coal mines or parts thereof as aforesaid, the use of permitted explosives is prohibited unless the following conditions are observed :—

- (a) Every charge of the explosive shall be placed in a properly drilled shot hole and shall have sufficient stemming :
- (b) Every charge shall be fired by an efficient electrical apparatus, or by some other means equally secure against the ignition of inflammable gas or coal dust :
- (c) Every charge shall be fired by a competent person appointed in writing for this duty by the owner, agent, or manager of the mine, and not being a person whose wages depend on the amount of mineral to be gotten :
- (d) Each explosive shall be used in the manner and subject to the conditions prescribed in the Schedules hereto :

Provided that nothing in this Order shall prohibit the use of a safety fuse in any mine in which inflammable gas has not been found within the previous three months in such quantity as to be indicative of danger.

Conditional prohibition of all explosives in main roads.

3. In every coal mine the use of any explosive is prohibited in the main haulage roads and in the intakes unless all workmen have been removed from the seam in which the shot is to be fired, and from all seams communicating with the shaft on the same level, except the men engaged in firing the shot, and in addition such other persons, not exceeding ten in number, as are necessarily employed in attending to the ventilating furnaces, steam boilers, engines, machinery, winding apparatus, signals, or horses, or in inspecting the mine ; or unless a permitted explosive is used under the conditions prescribed in Section 2 of this Order, and unless every part of the roof, floor, and sides of the main haulage road or intake, within a distance of 20 yards from the place where it is used, is, at the time of firing, thoroughly wet, either naturally or from the application of water thereto.

This section shall not apply to such portions of the main haulage roads and intakes as are within 100 yards of the coal face.

This section shall not authorise the use of any explosive in any case where the use of such explosive is prohibited by Sections 1 or 2 of this Order.

Conditional prohibition of detonators.

4. No detonator shall be used in any mine unless the following conditions are observed :—

- (a) Detonators shall be under the control of the owner, agent, or manager of the mine, or some person specially appointed in writing by the owner, agent, or manager for the purpose, and shall be issued only to shot firers or other persons specially authorised by the owner, agent, or manager, in writing.
- (b) Shot firers and other authorised persons shall keep all detonators issued to them until about to be used in a securely locked case or box separate from any other explosive.

Application of Order.

5. Sections 1, 2, and 3 of this Order shall not apply to mines of clay, or stratified or nodular ironstone, nor shall they apply to shafts in course of being sunk from the surface, or deepened, or to drifts and other outlets being driven from the surface, if such shafts, drifts, or outlets are not ventilated by return air.

Where a mine contains several separate seams this Order shall apply to each seam as if it were a separate mine.

Definitions.

6. In this Order the term “permitted explosives” means such explosives as are named and defined in the Schedule hereto : provided that where the composition, quality or character of any explosive is defined in such Schedule, any article alleged to be such explosive which differs therefrom in composition, quality, or character, whether by reason of deterioration or otherwise, shall not be deemed to be the explosive so defined ; provided further that an owner, agent, or manager shall not be responsible for the composition, quality, or character of an explosive, if he shows that he has in good faith obtained a written certificate from the maker of the explosive that it complies with the terms of the Schedule, and that he has taken all reasonable means to prevent deterioration of the explosive while stored.

The term “road” includes all roads of any description extending from the shaft or outlet to within 10 yards of the coal face.

The term “main haulage road” means a road which has been, or for the time being is, in use for moving trams by gravity or by steam or other mechanical power.

7. This Order shall come into force on the 1st day of November, 1901, from which date all previous Orders relating to the use of explosives in mines made in pursuance of Section 6 of the Coal Mines Regulation Act, 1896, are revoked.

8. This Order may be cited as the Explosives in Coal Mines Order of 1st October, 1901.

CHAS. T. RITCHIE,

One of His Majesty's Principal Secretaries of State.

Home Office, 1st October, 1901.

Schedule.

LIST OF PERMITTED EXPLOSIVES.^a

Ammonite, consisting in every 100 parts by weight of the finished explosive of not more than 89 parts and not less than 87 parts of neutral nitrate of ammonium, with not more than 13 parts and not less than 11 parts of thoroughly purified dinitro-naphthalene, and with no other ingredient, the whole being uniformly incorporated :

Provided—

- (1) That the explosive shall be used only when contained in a case of lead and tin alloy thoroughly waterproofed with pure paraffin wax ;
- (2) That the explosive shall be used only with a detonator or electric detonator of not less strength than that known as No. 6½ (i.e., the detonator or electric detonator to be used shall possess an effective detonative strength as great as, or greater than, that of one containing 19 grains of a composition consisting in every 100 parts by weight of 80 parts of fulminate of mercury and 20 parts of chlorate of potassium) ;
- (3) That the explosive has been made at the works of the Miners' Safety Explosives Company, Limited, at Stanford-le-Hope, in the County of Essex ;
- (4) That the explosive is in all respects similar to the sample submitted to test on the 15th day of June, 1900 ; and
- (5) That in addition to the marking on the outer package required by an Order of the Secretary of State, made under the Explosives Act, 1875, and in force for the time being, such outer package shall bear the words “As defined in the List of Permitted Explosives” ; and, further, that each inner package shall be clearly marked with the words “Permitted Explosive, to be used only with not less than No. 6½ detonator,” and also with the name of the explosive, the name of the manufacturer, the date and place of manufacture, and the nature and proportion of the ingredients.

Amvis, consisting in every 100 parts by weight of the finished explosive of not more than 91 parts and not less than 88 parts of nitrate of ammonium, with not more than 6 parts and not less than 4 parts of wood-meal, and with not more than half-a-part of moisture, and with not more than 6 parts and not less than 4 parts of thoroughly purified di-nitro-benzol and chlorinated naphthalene, and with no other ingredient, provided that the chlorine does not exceed 1 per cent. by weight of the finished explosive :

Provided—

- (1) That the explosive shall be used only when contained in a case of stout paper thoroughly waterproofed with ceresine ;
- (2) That the explosive shall be used only with a special detonator or electric detonator containing not less than 15 grains of a composition consisting in every 100 parts by weight of 95 parts of fulminate of mercury and 5 parts of chlorate of potassium ;
- (3) That the explosive has been made at the works of the Roburite Explosives Company, Limited, at Gathurst, near Wigan, in the County of Lancashire ;

^a This list is subject to revision in accordance with the results of official tests made from time to time in the Government Testing Station at Woolwich. All the explosives now in the Schedule have passed the “Special Test” as laid down in the Home Office Memorandum of 18th October, 1899.

- (4) That the explosive is in all respects similar to the sample submitted to test on the 6th December, 1899; and
- (5) That in addition to the marking on the outer package required by an Order of the Secretary of State, made under the Explosives Act, 1875, and in force for the time being, such outer package shall bear the words "As defined in the List of Permitted Explosives;" and, further, that each inner package shall be clearly marked with the words "Permitted Explosive, to be used only with a special detonator," and also with the name of the explosive, the name of the manufacturer, the date and place of manufacture, and the nature and proportion of the ingredients.

Aphosite, consisting in every 100 parts by weight of the finished explosive of not more than 62 parts and not less than 58 parts of neutral nitrate of ammonium, with not more than 31 parts and not less than 28 parts of nitrate of potassium, with not more than $4\frac{1}{2}$ parts and not less than $3\frac{1}{2}$ parts of charcoal, with not more than $4\frac{1}{2}$ parts and not less than $3\frac{1}{2}$ parts of wood-meal, with not more than 3 parts and not less than 2 parts of pure distilled sulphur, with not more than $1\frac{1}{2}$ parts of moisture, and with no other ingredient:—

Provided—

- (1) That if the explosive has been compressed into a pellet, the density shall not exceed 1.25.
- (2) That the explosive shall be used only, when in pellet form, in a wrapper of thin paraffined paper; when granulated, in a case of stout paper thoroughly waterproofed with ceresine and paraffin;
- (3) That the explosive, when in pellet form, shall be used with an electric fuze containing 5 grains of gunpowder, or with other means equally efficient in igniting the explosive, and that, when granulated, the explosive shall be used with the methods of ignition specified above or with a detonator or electric detonator of not less strength than that known as No. 6 (*i.e.*, the detonator or electric detonator to be used shall possess an effective detonative strength as great as, or greater than, that of one containing 15 grains of a composition consisting in every 100 parts by weight of 80 parts of fulminate of mercury and 20 parts of chlorate of potassium);
- (4) That the explosive has been made at the works of the Nitrate Explosives Company, Limited, at Gatebeck, near Kendal, in the county of Westmoreland;
- (5) That the explosive is similar in all respects to one or other of the samples submitted to test on the 23rd day of October, 1900, on the 20th day of December, 1900, or on the 1st day of March, 1901; and
- (6) That in addition to the marking on the outer package required by an Order of the Secretary of State, made under the Explosives Act, 1875, and in force for the time being, such outer package shall bear the words "As defined in the List of Permitted Explosives;" and, further, that each inner package shall be clearly marked with the words "Permitted Explosive," and also with the name of the explosive, the name of the manufacturer, the date and place of manufacture, and the nature and proportion of the ingredients.

Bellite No. 1, consisting in every 100 parts by weight of the finished explosive of not more than 85 parts and not less than 82 parts of neutral nitrate of ammonium, with not more than 18 parts or not less than 15 parts of thoroughly purified di-nitro-benzol, and with not more than three-fourths of a part of moisture and with no other ingredient; the whole being uniformly incorporated:—

Provided—

- (1) That the explosive shall be used only when contained in a case of linen paper thoroughly waterproofed with a mixture of carnauba and paraffin waxes;
- (2) That the explosive shall be used only with a detonator or electric detonator of not less strength than that known as No. 7 (*i.e.*, the detonator or electric detonator to be used shall possess an effective detonative strength as great as, or greater than, that of one containing 23 grains of a composition consisting in every 100 parts by weight of 80 parts of fulminate of mercury and 20 parts of chlorate of potassium);
- (3) That the explosive has been made at the works of the Lancashire Explosives Company, Limited, at Withnell, in the County of Lancashire;
- (4) That the explosive is in all respects similar to the sample submitted to test on the 25th and 26th days of June, 1901; and
- (5) That in addition to the marking on the outer package required by an Order of the Secretary of State, made under the Explosives Act, 1875, and in force for the time being, such outer package shall bear the words "As defined in the List of Permitted Explosives;" and, further, that each inner package shall be clearly marked with the words "Permitted Explosive, to be used only with not less than No. 7 detonator," and also with the name of the explosive, the name of the manufacturer, the date and place of manufacture, and the nature and proportion of the ingredients.

Bellite No. 3, consisting in every 100 parts by weight of the finished explosive of not more than 95 parts and not less than 92 parts of neutral nitrate of ammonium, with not more than 8 parts and not less than 5 parts of thoroughly purified di-nitro-benzol and with not more than three-fourths of a part of moisture and with no other ingredients; the whole being uniformly incorporated:—

Provided—

- (1) That the explosive shall be used only when contained in a case of linen paper thoroughly waterproofed with a mixture of carnauba and paraffin waxes;
- (2) That the explosive shall be used only with a detonator or electric detonator of not less strength than that known as No. 7 (*i.e.*, the detonator or electric detonator to be used shall possess an effective detonative strength as great as, or greater than, that of one containing 23 grains of a composition consisting in every 100 parts by weight of 80 parts of fulminate of mercury and 20 parts of chlorate of potassium);
- (3) That the explosive has been made at the works of the Lancashire Explosives Company, Limited, at Withnell, in the County of Lancashire;
- (4) That the explosive is in all respects similar to the sample submitted to test on the 25th day of June, 1901; and
- (5) That in addition to the marking on the outer package required by an Order of the Secretary of State, made under the Explosives Act, 1875, and in force for the time being, such outer package shall bear the words "As defined in the List of Permitted Explosives;" and, further, that each inner package shall be clearly marked with the words "Permitted Explosive, to be used only with not less than No. 7 detonator," and also with the name of the explosive, the name of the manufacturer, the date and place of manufacture, and the nature and proportion of the ingredients.

Cambrite, consisting in every 100 parts by weight of the finished explosive of not less than 92 parts of Nobel Carbonite hereinafter defined, and with or without not more than 8 parts of oxalate of ammonium, and with no other ingredient, the whole being uniformly incorporated, and of such character and consistency as not to be liable to exudation:—

Provided—

- (1) That the explosive shall be used only when contained in a non-waterproofed wrapper of parchment paper;
- (2) That the explosive shall be used only with a detonator or electric detonator of not less strength than that known as No. 6 (*i.e.*, the detonator or electric detonator to be used shall possess an effective detonative strength as great as, or greater than, that of one containing 15 grains of a composition consisting in every 100 parts by weight of 80 parts of fulminate of mercury and 20 parts of chlorate of potassium);
- (3) That the explosive has been made at the works of Nobel's Explosives Company, Limited, at Ardeer, in the county of Ayr;
- (4) That the explosive is in all respects similar to the samples submitted to test on the 4th day of September, 1900;
- (5) That in addition to the marking on the outer package required by an Order of the Secretary of State, made under the Explosives Act, 1875, and in force for the time being, such outer package shall bear the words "As defined in the List of Permitted Explosives;" and, further, that each inner package shall be clearly marked with the words "Permitted Explosive, to be used only with not less than No. 6 detonator," and also with the name of the explosive, the name of the manufacturer, the date and place of manufacture, and the nature and proportion of the ingredients; and
- (6) That the explosive, if in a frozen condition, shall be thoroughly thawed in a safe and suitable manner before use.

Carbonite,

Carbonite, consisting in every 100 parts by weight of the finished explosive of not more than 27 parts and not less than 25 parts of thoroughly purified nitro-glycerine, with not more than 36 parts and not less than 30 parts of nitrate of barium and nitrate of potassium, or either of them, with not more than 37 parts and not less than 34 parts of wood-meal, and with not more than 5 parts and not less than 4 parts of moisture, with or without not more than half-a-part of sulphuretted benzol, and not more than half-a-part of carbonate of sodium and carbonate of calcium, or either of them, and with no other ingredient, the whole being uniformly incorporated and of such character and consistency as not to be liable to exudation :

Provided—

- (1) That the explosive shall be used only when contained in a non-waterproofed wrapper of parchment paper ;
- (2) That the explosive shall be used only with a detonator or electric detonator of not less strength than that known as No. 6 (*i.e.*, the detonator or electric detonator to be used shall possess an effective detonative strength as great as, or greater than, that of one containing 15 grains of a composition consisting in every 100 parts by weight of 80 parts of fulminate of mercury and 20 parts of chlorate of potassium) ;
- (3) That the explosive has been made at the works of the Carbonite Syndicate, Limited, at Schlebusch, in Germany ;
- (4) That the explosive is in all respects similar to the sample submitted to test on the 18th day of June, 1900 ;
- (5) That in addition to the marking on the outer package required by an Order of the Secretary of State, made under the Explosives Act, 1875, and in force for the time being, such outer package shall bear the words "As defined in the List of Permitted Explosives" ; and, further, that each inner package shall be clearly marked with the words "Permitted Explosive, to be used only with not less than No. 6 detonator," and also with the name of the explosive, the name of the manufacturer, the date and place of manufacture, and the nature and proportion of the ingredients ; and
- (6) That the explosive, if in a frozen condition, shall be thoroughly thawed in a safe and suitable manner before use.

Dahmenite A, consisting in every 100 parts by weight of the finished explosive of not more than 93½ parts and not less than 91½ parts of nitrate of ammonium, with not more than 6½ parts and not less than 4 parts of naphthalene, with not more than 2½ parts and not less than 1½ parts bichromate of potash, and with not more than 1 part of moisture and with no other ingredient, the whole being uniformly mixed :

Provided—

- (1) That the explosive shall be used only when contained in a case of paper, thoroughly waterproofed with eeresine and resin ;
- (2) That the explosive shall be used only with a detonator or electric detonator of not less strength than that known as No. 7 (*i.e.*, the detonator or electric detonator to be used shall possess an effective detonative strength as great as, or greater than, that of one containing 23 grains of a composition consisting in every 100 parts by weight of 80 parts of fulminate of mercury and 20 parts of chlorate of potassium) ;
- (3) That the explosive has been made at the works of De Gezamenlijke Buskruidmakers van Noord-Holland, Utrecht en Zeeland ;
- (4) That the explosive is in all respects similar to the sample submitted to test on the 23rd day of April, 1901 ; and
- (5) That in addition to the marking on the outer package required by an Order of the Secretary of State, made under the Explosives Act, 1875, and in force for the time being, such outer package shall bear the words "As defined in the List of Permitted Explosives" ; and, further, that each inner package shall be clearly marked with the words "Permitted Explosive, to be used only with not less than No. 7 detonator," and also with the name of the explosive, the name of the manufacturer, the date and place of manufacture, and the nature and proportion of the ingredients.

Electronite, consisting in every 100 parts by weight of the finished explosive of not more than 75 parts and not less than 71 parts of neutral nitrate of ammonium, with not more than 20 parts and not less than 18 parts of nitrate of barium, and with not more than 10 parts and not less than 7 parts of a mixture of wood-meal, whether slightly charred or not, and starch, with not more than half-a-part of moisture, and with no other ingredient :

Provided—

- (1) That the explosive shall be used only when contained in a case of lead thoroughly waterproofed ;
- (2) That the explosive shall be used only with a detonator or electric detonator of not less strength than that known as No. 7 (*i.e.*, the detonator or electric detonator to be used shall possess an effective detonative strength as great as, or greater than, that of one containing 23 grains of a composition consisting in every 100 parts by weight of 80 parts of fulminate of mercury and 20 parts of chlorate of potassium) ;
- (3) That the explosive has been made at the works of Messrs. Curtis's and Harvey, Limited, at Tonbridge, in the county of Kent, or at Glenlean, near Dunoon, in the county of Argyll ;
- (4) That the explosive, when slightly charred wood-meal is present, shall be in all respects similar to the sample submitted to test on the 14th December, 1899, and when the wood-meal is not so charred, shall be in all respects similar to the sample submitted to test on the 12th December, 1899 ; and
- (5) That in addition to the marking on the outer package required by an Order of the Secretary of State, made under the Explosives Act, 1875, and in force for the time being, such outer package shall bear the words "As defined in the List of Permitted Explosives" ; and, further, that each inner package shall be clearly marked with the words "Permitted Explosive, to be used only with not less than No. 7 detonator," and also with the name of the explosive, the name of the manufacturer, the date and place of manufacture, and the nature and proportion of the ingredients.

Faversham Powder, consisting in every 100 parts by weight of the finished explosive of not more than 86 parts and not less than 84 parts of neutral nitrate of ammonium, with not more than 12 parts and not less than 10 parts of thoroughly purified tri-nitro-toluol, with not more than 2 parts and not less than 1 part of chloride of ammonium, with not more than 3 parts and not less than 2 parts of chloride of sodium, and with not more than half-a-part of moisture, and with no other ingredient :

Provided—

- (1) That the explosive shall be used only when contained in a case of an alloy of lead, tin, zinc, and antimony, thoroughly waterproofed ;
- (2) That the explosive shall be used only with a detonator or electric detonator of not less strength than that known as No. 6 (*i.e.*, the detonator or electric detonator to be used shall possess an effective detonative strength as great as, or greater than, that of one containing 15 grains of a composition consisting in every 100 parts by weight of 80 parts of fulminate of mercury and 20 parts of chlorate of potassium) ;
- (3) That the explosive has been made at the works of the Cotton Powder Company, Limited, at Upcles Marshes, near Faversham, in the county of Kent, or at their works near Melling, in the county of Lancashire ;
- (4) That the explosive is similar in all respects to the sample submitted to test on the 24th day of April, 1901 ; and
- (5) That in addition to the marking on the outer package required by an Order of the Secretary of State, made under the Explosives Act, 1875, and in force for the time being, such outer package shall bear the words "As defined in the List of Permitted Explosives" ; and, further, that each inner package shall be clearly marked with the words "Permitted Explosive, to be used only with not less than No. 6 detonator," and also with the name of the explosive, the name of the manufacturer, the date and place of manufacture, and the nature and proportion of the ingredients.

Kymite, consisting in every 100 parts by weight of the finished explosive of not more than 27 parts and not less than 25 parts of thoroughly purified nitro-glycerine, with not more than 36 parts and not less than 30 parts of nitrate of barium, with not more than 39 parts and not less than 36 parts of wood-meal, with not more than 5 parts and not less than 4 parts of moisture, with not more than half-a-part of chalk, and with no other ingredient ; the whole being uniformly incorporated and of such character and consistency as not to be liable to exudation :

Provided—

- (1) That the explosive shall be used only when contained in a non-waterproofed wrapper of vegetable parchment ;
- (2) That the explosive shall be used only with a detonator or electric detonator of not less strength than that known as No. 6 (*i.e.*, the detonator or electric detonator to be used shall possess an effective detonative strength as great as, or greater than, that of one containing 15 grains of a composition consisting in every 100 parts by weight of 80 parts of fulminate of mercury and 20 parts of chlorate of potassium) ;

(3)

- (3) That the explosive has been made at the works of Kynoch, Limited, at Kynochtown, near Stanford-le-Hope, in the county of Essex, or at Ferrybank, Arklow, in the county Wicklow;
- (4) That the explosive is in all respects similar to the sample submitted to test on the 18th day of January, 1901;
- (5) That in addition to the marking on the outer package required by an Order of the Secretary of State, made under the Explosives Act, 1875, and in force for the time being, such outer package shall bear the words "As defined in the List of Permitted Explosives"; and, further, that each inner package shall be clearly marked with the words "Permitted Explosive, to be used only with not less than No. 6 detonator," and also with the name of the manufacturer, the date and place of manufacture, and the nature and proportion of the ingredients; and
- (6) That the explosive, if in a frozen condition, shall be thoroughly thawed in a safe and suitable manner before use.

Nobel Ardeer Powder, consisting in every 100 parts by weight of the finished explosive of not more than 34 parts and not less than 31 parts of thoroughly purified nitro-glycerine, with not more than 14 parts and not less than 11 parts of kieselguhr, with not more than 51 parts and not less than 47 parts of sulphate of magnesium, and with not more than 6 parts and not less than 4 parts of nitrate of potassium, with or without the addition of not more than half-a-part of carbonate of ammonium and not more than half-a-part of carbonate of calcium, and with no other ingredient; the whole being uniformly incorporated and of such character and consistency as not to be liable to exudation:

Provided—

- (1) That the explosive shall be used only when contained in a non-waterproofed wrapper of parchment paper;
- (2) That the explosive shall be used only with a detonator or electric detonator of not less strength than that known as No. 3 (*i.e.*, the detonator or electric detonator to be used shall possess an effective detonative strength as great as, or greater than, that of one containing 8 grains of a composition consisting in every 100 parts by weight of 80 parts of fulminate of mercury and 20 parts of chlorate of potassium);
- (3) That the explosive has been made at the works of Nobel's Explosives Company, Limited, at Ardeer, in the county of Ayr;
- (4) That the explosive is in all respects similar to the sample submitted to test on the 12th January, 1900;
- (5) That in addition to the marking on the outer package required by an Order of the Secretary of State, made under the Explosives Act, 1875, and in force for the time being, such outer package shall bear the words "As defined in the List of Permitted Explosives"; and, further, that each inner package shall be clearly marked with the words "Permitted Explosive, to be used only with not less than No. 3 detonator," and also with the name of the explosive, the name of the manufacturer, the date and place of manufacture, and the nature and proportion of the ingredients; and
- (6) That the explosive, if in a frozen condition, shall be thoroughly thawed in a safe and suitable manner before use.

Nobel Carbonite, consisting in every 100 parts by weight of the finished explosive of not more than 27 parts and not less than 25 parts of thoroughly purified nitro-glycerine, with not more than $4\frac{1}{2}$ parts and not less than $3\frac{1}{2}$ parts of nitrate of barium, with not more than 32 parts and not less than 28 parts of nitrate of potassium, with not more than 42 parts and not less than 39 parts of wood-meal, provided that the wood-meal contains by weight not more than 20 per cent. and not less than 10 per cent. of moisture, with or without not more than half-a-part of sulphuretted benzol, and not more than half-a-part of carbonate of sodium and carbonate of calcium, or either of them, and with no other ingredient, the whole being uniformly incorporated and of such character and consistency as not to be liable to exudation:

Provided—

- (1) That the explosive shall be used only when contained in a non-waterproofed wrapper of parchment paper;
- (2) That the explosive shall be used only with a detonator or electric detonator of not less strength than that known as No. 6 (*i.e.*, the detonator or electric detonator to be used shall possess an effective detonative strength as great as, or greater than, that of one containing 15 grains of a composition, consisting in every 100 parts by weight of 80 parts of fulminate of mercury and 20 parts of chlorate of potassium);
- (3) That the explosive has been made at the works of Nobel's Explosives Company, Limited, at Ardeer, in the county of Ayr;
- (4) That the explosive is in all respects similar to the sample submitted to test on the 23rd day of January, 1901;
- (5) That in addition to the marking on the outer package required by an Order of the Secretary of State, made under the Explosives Act, 1875, and in force for the time being, such outer package shall bear the words "As defined in the List of Permitted Explosives"; and, further, that each inner package shall be clearly marked with the words "Permitted Explosive, to be used only with not less than No. 6 detonator," and also with the name of the explosive, the name of the manufacturer, the date and place of manufacture, and the nature and proportion of the ingredients; and
- (6) That the explosive, if in a frozen condition, shall be thoroughly thawed in a safe and suitable manner before use.

Pit-ite, consisting in every 100 parts by weight of the finished explosive of not more than 27 parts and not less than 25 parts of thoroughly purified nitro-glycerine, with not more than 35 parts and not less than 31 parts of nitrate of barium with not more than 43 parts and not less than 40 parts of wood-meal, provided that the wood-meal contains by weight not more than 15 per cent. and not less than 5 per cent. of moisture, with or without not more than half-a-part of carbonate of sodium and carbonate of calcium, or either of them, and with no other ingredient, the whole being uniformly mixed and of such character and consistency as not to be liable to exudation:

Provided—

- (1) That the explosive shall be used only when contained in a non-waterproofed wrapper of parchment paper;
- (2) That the explosive shall be used only with a detonator or electric detonator of not less strength than that known as No. 6 (*i.e.*, the detonator or electric detonator to be used shall possess an effective detonative strength as great as, or greater than, that of one containing 15 grains of a composition consisting in every 100 parts by weight of 80 parts of fulminate of mercury and 20 parts of chlorate of potassium);
- (3) That the explosive has been made at the works of the New Explosives Company, Limited, at Stowmarket, in the county of Suffolk;
- (4) That the explosive is in all respects similar to the sample submitted to test on the 1st day of May, 1901;
- (5) That in addition to the marking on the outer package required by an Order of the Secretary of State, made under the Explosives Act, 1875, and in force for the time being, such outer package shall bear the words "As defined in the List of Permitted Explosives"; and, further, that each inner package shall be clearly marked with the words "Permitted Explosive, to be used only with not less than No. 6 detonator," and also with the name of the explosive, the name of the manufacturer, the date and place of manufacture, and the nature and proportion of the ingredients; and
- (6) That the explosive, if in a frozen condition, shall be thoroughly thawed in a safe and suitable manner before use.

Roburite No. 3, consisting in every 100 parts by weight of the finished explosive of not more than 89 parts and not less than 86 parts of nitrate of ammonium, with not more than 13 parts and not less than 9 parts of thoroughly purified dinitrobenzol, with or without not more than two parts of chloro-naphthalene containing of chlorine not more than one part with not more than half-a-part of moisture and with no other ingredient; the whole being uniformly incorporated:

Provided—

- (1) That the explosive shall be used only when contained in a case of paper thoroughly waterproofed with ceresine;
- (2) That the explosive shall be used only with a special detonator or electric detonator containing not less than 15 grains of a composition consisting in every 100 parts by weight of 95 parts of fulminate of mercury and 5 parts of chlorate of potassium;
- (3) That the explosive has been made at the works of the Roburite Explosives Company, Limited, at Gathurst, near Wigan, in the county of Lancashire;
- (4) That the explosive is in all respects similar to the sample submitted to test on the 6th December, 1899; and
- (5) That in addition to the marking on the outer package required by an Order of the Secretary of State, made under the Explosives Act, 1875, and in force for the time being, such outer package shall bear the words "As defined in the List of Permitted Explosives"; and, further, that each inner package shall be clearly marked with the words "Permitted Explosive, to be used only with a special detonator," and also with the name of the explosive, the name of the manufacturer, the date and place of manufacture, and the nature and proportion of the ingredients.

Saxonite, consisting in every 100 parts by weight of the finished explosive of not more than 27 parts and not less than 12 parts of oxalate of ammonium, with not more than 88 parts and not less than 73 parts of a mixture consisting in every 100 parts by weight of not more than 62 parts and not less than 58 parts of thoroughly purified nitro-glycerine, with not more than $5\frac{1}{2}$ parts and not less than $3\frac{1}{2}$ parts of nitro-cotton, carefully washed and purified, with not more than $30\frac{1}{2}$ parts and not less than $25\frac{1}{2}$ parts of nitrate of potassium, with not more than $8\frac{1}{2}$ parts and not less than 6 parts of wood-meal, provided that such wood-meal shall contain not more than 15 per cent. and not less than 5 per cent. by weight of moisture, and with not more than half-a-part of chalk, and with no other ingredient; the whole being uniformly incorporated and of such character and consistency as not to be liable to exudation:

Provided—

- (1) That the explosive shall be used only when contained in a non-waterproofed wrapper of parchment paper;
- (2) That the explosive shall be used only with a detonator or electric detonator of not less strength than that known as No. 6 (*i.e.*, the detonator or electric detonator to be used shall possess an effective detonative strength as great as, or greater than, that of one containing 15 grains of a composition consisting in every 100 parts, by weight, of 80 parts of fulminate of mercury and 20 parts of chlorate of potassium);
- (3) That the explosive has been made at the works of Nobel's Explosives Company, Limited, at Ardeer, in the county of Ayr;
- (4) That the explosive is in all respects similar to one or other of the samples submitted to test on the 4th day of September, on the 16th day of October, on the 4th day of December, 1900, or on the 14th day of May, 1901;
- (5) That in addition to the marking on the outer package required by an Order of the Secretary of State, made under the Explosives Act, 1875, and in force for the time being, such outer package shall bear the words "As defined in the List of Permitted Explosives"; and, further, that each inner package shall be clearly marked with the words "Permitted Explosive, to be used only with not less than No. 6 detonator," and also with the name of the explosive, the name of the manufacturer, the date and place of manufacture, and the nature and proportion of the ingredients; and
- (6) That the explosive, if in a frozen condition, shall be thoroughly thawed in a safe and suitable manner before use.

Special Bulldog, consisting in every 100 parts by weight of the finished explosive of not more than 86 parts and not less than 84 parts of nitrate of potassium, with not more than $3\frac{1}{2}$ parts and not less than $2\frac{1}{2}$ parts of hydrated carbonate of magnesium, with not more than 13 parts and not less than 12 parts of charcoal, with not more than 2 parts of moisture, and with no other ingredient, the whole being uniformly incorporated:

Provided—

- (1) That the explosive shall be used only when contained in a wrapper of brown paper similar in all respects to that in which it was submitted to test on the 6th day of March, 1901;
- (2) That the explosive has been compressed into a pellet of a density not exceeding 1.45;
- (3) That the explosive shall be used only with an electric fuze, containing 5 grains of gunpowder, or with other means equally efficient in igniting the explosive;
- (4) That the explosive has been made at the Home, Marsh, or Oare Works of Messrs. Curtiss and Harvey, Limited, at Faversham, in the county of Kent, or at their works at Roslin, in the county of Edinburgh, or at their works at Glyn Neath, in the county of Glamorgan;
- (5) That the explosive is in all respects similar to the sample submitted to test on the 6th day of March, 1901; and
- (6) That in addition to the marking on the outer package required by an Order of the Secretary of State, made under the Explosives Act, 1875, and in force for the time being, such outer package shall bear the words "As defined in the List of Permitted Explosives"; and, further, that each inner package shall be clearly marked with the words "Permitted Explosive," and also with the name of the explosive, the name of the manufacturer, the date and place of manufacture, and the nature and proportion of the ingredients.

Stow-ite, consisting in every 100 parts by weight of the finished explosive of not more than 61 parts and not less than 58 parts of thoroughly purified nitro-glycerine, with not more than 5 parts and not less than $4\frac{1}{2}$ parts of nitro-cotton, carefully washed and purified, with not more than 20 parts and not less than 18 parts of nitrate of potassium, with not more than 7 parts and not less than 6 parts of wood-meal, provided that such wood-meal shall contain not more than 15 per cent. and not less than 5 per cent. by weight of moisture, with not more than 13 parts and not less than 11 parts of oxalate of ammonium, and with no other ingredient; the whole being uniformly incorporated and of such character and consistency as not to be liable to exudation:

Provided—

- (1) That the explosives shall be used only when contained in a non-waterproofed wrapper of parchment paper;
- (2) That the explosive shall be used only with a detonator or electric detonator of not less strength than that known as No. 6 (*i.e.*, the detonator or electric detonator to be used shall possess an effective detonative strength as great as, or greater than, that of one containing 15 grains of a composition consisting in every 100 parts, by weight, of 80 parts of fulminate of mercury and 20 parts of chlorate of potassium);
- (3) That the explosive has been made at the works of the New Explosives Company, Limited, at Stowmarket, in the county of Suffolk;
- (4) That the explosive is in all respects similar to the sample submitted to test on the 20th day of June, 1901;
- (5) That in addition to the marking on the outer package required by an Order of the Secretary of State, made under the Explosives Act, 1875, and in force for the time being, such outer package shall bear the words "As defined in the List of Permitted Explosives"; and, further, that each inner package shall be clearly marked with the words "Permitted Explosives, to be used only with not less than No. 6 detonator," and also with the name of the explosive, the name of the manufacturer, the date and place of manufacture, and the nature and proportion of the ingredients; and
- (6) That the explosive, if in a frozen condition, shall be thoroughly thawed in a safe and suitable manner before use.

Thunderite, consisting in every 100 parts by weight of the finished explosive of not more than 93 parts and not less than 91 parts of neutral nitrate of ammonium, with not more than 5 parts and not less than 3 parts of thoroughly purified trinitro-toluol, with not more than 5 parts and not less than 3 parts of flour, with not more than half-a-part of moisture, and with no other ingredient:

Provided—

- (1) That the explosive shall be used only when contained in a case of stout paper thoroughly waterproofed with ceresine;
- (2) That the explosive shall be used only with a detonator or electric detonator of not less strength than that known as No. 8 (*i.e.*, the detonator or electric detonator to be used shall possess an effective detonative strength as great as, or greater than, that of one containing 30.9 grains of a composition consisting in every 100 parts by weight of 80 parts of fulminate of mercury and 20 parts of chlorate of potassium);
- (3) That the explosive has been made at the works of the Carbonite Syndicate, Limited, at Schlebusch, in Germany;
- (4) That the explosive is similar in all respects to the sample submitted to test on the 9th day of January, 1901; and
- (5) That in addition to the marking on the outer package required by an Order of the Secretary of State, made under the Explosives Act, 1875, and in force for the time being, such outer package shall bear the words "As defined in the List of Permitted Explosives"; and, further, that each inner package shall be clearly marked with the words "Permitted Explosive, to be used only with not less than No. 8 detonator," and also with the name of the explosive, the name of the manufacturer, the date and place of manufacture, and the nature and proportion of the ingredients.

Virite, consisting of every 100 parts by weight of the finished explosive of not more than 12 parts and not less than 9 parts of oxalate of ammonium, with not more than 40 parts and not less than 35 parts of neutral nitrate of ammonium, with not more than 38 parts and not less than 33 parts of nitrate of potassium, with not more than 5 parts and not less than 4 parts of pure distilled sulphur, with not more than 12.5 parts and not less than 10.5 parts of charcoal, with not more than 2 parts and not less than 1 part of moisture, and with no other ingredient:

Provided—

- (1) That the explosive shall be used only in a case of stout paper thoroughly waterproofed with ceresine and paraffin;
- (2) That the explosive shall be used only with an electric fuze containing 5 grains of gunpowder, or with other means equally efficient in igniting the explosive;

- (3) That the explosive has been made at the works of the Nitrate Explosives Company, Limited, at Gatebeck, near Kendal, in the county of Westmoreland;
- (4) That the explosive is similar in all respects to the sample submitted to test on the 28th day of February, 1901; and
- (5) That in addition to the marking on the outer package required by an Order of the Secretary of State, made under the Explosives Act, 1875, and in force for the time being, such outer package shall bear the words "As defined in the List of Permitted Explosives"; and, further, that each inner package shall be clearly marked with the words "Permitted Explosive," and also with the name of the explosive, the name of the manufacturer, the date and place of manufacture, and the nature and proportion of the ingredients.

Westfalite No. 1, consisting in every 100 parts by weight of the finished explosive of not more than 96 parts and not less than 94 parts of neutral nitrate of ammonium, with not more than 6 parts and not less than 4 parts of resin, consisting of pure pine resin which does not melt below a temperature of 200 degrees Fahr., with not more than half-a-part of moisture, and with no other ingredient; the whole being uniformly incorporated:

Provided—

- (1) That the explosive shall be used only when contained in a non-waterproofed wrapper of paper, the outer waterproofed paper having previously been removed;
- (2) That the explosive shall be used only with a detonator or electric detonator of not less strength than that known as No. 8 (*i.e.*, the detonator or electric detonator to be used shall possess an effective detonative strength as great as, or greater than, that of one containing 30.9 grains of a composition consisting in every 100 parts by weight of 80 parts of fulminate of mercury and 20 parts of chlorate of potassium);
- (3) That the explosive has been made at the works of the British and Colonial Colliery Supply Association, Limited, at Denaby, in the county of Yorkshire;
- (4) That the explosive is in all respects similar to the sample submitted to test on the 15th day of August, 1901; and
- (5) That in addition to the marking on the outer package required by an Order of the Secretary of State, made under the Explosives Act, 1875, and in force for the time being, such outer package shall bear the words "As defined in the List of Permitted Explosives"; and, further, that each inner package shall be clearly marked with the words "Permitted Explosive, to be used with not less than No. 8 detonator," and also with the name of the manufacturer, the date and place of manufacture, and the nature and proportion of the ingredients.

Westfalite No. 2, consisting in every 100 parts by weight of the finished explosive of not more than 92 parts and not less than 90 parts of neutral nitrate of ammonium, with not more than 5 parts and not less than 3 parts of nitrate of potassium, and with not more than 6 parts and not less than 4 parts of resin, consisting of pure pine resin which does not melt below a temperature of 200 degrees Fahr., with not more than half-a-part of moisture, and with no other ingredient; the whole being uniformly incorporated:

Provided—

- (1) That the explosive shall be used only when contained in a non-waterproofed wrapper of paper, the outer waterproofed paper having previously been removed;
- (2) That the explosive shall be used only with a detonator or electric detonator of not less strength than that known as No. 8 (*i.e.*, the detonator or electric detonator to be used shall possess an effective detonative strength as great as, or greater than, that of one containing 30.9 grains of a composition consisting in every 100 parts by weight of 80 parts of fulminate of mercury and 20 parts of chlorate of potassium);
- (3) That the explosive has been made at the works of the British and Colonial Colliery Supply Association, Limited, at Denaby, in the county of Yorkshire;
- (4) That the explosive is in all respects similar to the sample submitted to test on the 15th and 16th days of August, 1901; and
- (5) That in addition to the marking on the outer package required by an Order of the Secretary of State, made under the Explosives Act, 1875, and in force for the time being, such outer package shall bear the words "As defined in the List of Permitted Explosives"; and, further, that each inner package shall be clearly marked with the words "Permitted Explosive, to be used with not less than No. 8 detonator," and also with the name of the manufacturer, the date and place of manufacture, and the nature and proportion of the ingredients.

Statutory Rules and Orders, 1901.—No. 1010.

THE EXPLOSIVES IN COAL MINES ORDER OF THE 17TH DECEMBER, 1901.

WHEREAS by section 6 of the Coal Mines Regulation Act, 1896, it is enacted that a Secretary of State, on being satisfied that any explosive is, or is likely to become, dangerous, may by Order prohibit the use thereof in any mine or in any class of mines, either absolutely or subject to conditions: and whereas in pursuance of this power an order has been made by me entitled "The Explosives in Coal Mines Order of the 1st October, 1901."

I hereby, in pursuance of the power conferred on me by the said section, make the following Order amending the Order aforesaid:—

- (1) The Explosives in Coal Mines Order of the 1st October, 1901, shall be amended, and shall take effect as if the explosives named and defined in the Schedule to this Order were named and defined in the Schedule to that Order, and in all respects as if the Schedule to this Order formed part of the Schedule to that Order;
- (2) This Order may be cited as the Explosives in Coal Mines Order of 17th December, 1901.

CHAS. T. RITCHIE,

One of His Majesty's Principal Secretaries of State.

Home Office, Whitehall,
17th December, 1901.

Schedule.

LIST OF PERMITTED EXPLOSIVES.*

Clydite, consisting in every 100 parts by weight of the finished explosive of not less than 92 parts of Victorite hereinafter defined, and with or without not more than 8 parts of oxalate of ammonium, and with no other ingredient, the whole being uniformly incorporated, and of such character and consistency as not to be liable to exudation:

Provided—

- (1) That the explosive shall be used only when contained in a non-waterproofed wrapper of parchment paper;
- (2) That the explosive shall be used only with a detonator or electric detonator of not less strength than that known as No. 6 (*i.e.*, the detonator or electric detonator to be used shall possess an effective detonative strength as great as, or greater than, that of one containing 15 grains of a composition consisting in every 100 parts by weight of 80 parts of fulminate of mercury and 20 parts of chlorate of potassium);
- (3) That the explosive has been made at the works of Nobel's Explosives Company, Limited, at Ardeer, in the county of Ayr;
- (4) That the explosive is in all respects similar to the sample submitted to test on the 21st day of August, 1901;
- (5) That in addition to the marking on the outer packages required by an Order of the Secretary of State, made under the Explosives Act, 1875, and in force for the time being, such outer package shall bear the words "As defined in the List of Permitted Explosives"; and, further, that each inner package shall be clearly marked with the words "Permitted Explosive, to be used only with not less than No. 6 detonator," and also with the name of the explosive, the name of the manufacturer, the date and place of manufacture, and the nature and proportion of the ingredients; and
- (6) That the explosive, if in a frozen condition, shall be thoroughly thawed in a safe and suitable manner before use.

* This list is subject to revision in accordance with the results of official tests made from time to time in the Government Testing Station at Woolwich. All the explosives now in the Schedule have passed the "Special Test" as laid down in the Home Office Memorandum of the 18th October, 1899.

Haylite No. 1, consisting in every 100 parts by weight of the finished explosive of not more than 27 parts and not less than 25 parts of thoroughly purified nitro-glycerine, with not more than $1\frac{1}{2}$ parts and not less than half-a-part of nitro-cotton, carefully washed and purified, with not more than 14 parts and not less than 12 parts of wood-meal, provided that such wood-meal shall contain not more than 15 per cent. and not less than 5 per cent. by weight of moisture, with not more than 21 parts and not less than 19 parts of nitrate of potassium, with not more than 21 parts and not less than 19 parts of nitrate of barium, with not more than 8 parts and not less than 6 parts of mineral jelly free from acid, with not more than 12 parts and not less than 10 parts of oxalate of ammonium, and with no other ingredient; the whole being uniformly incorporated, and of such character and consistency as not to be liable to exudation:

Provided—

- (1) That the explosive shall be used only when contained in a non-waterproofed wrapper of parchment paper;
- (2) That the explosive shall be used only with a detonator or electric detonator of not less strength than that known as No. 6 (*i.e.* the detonator or electric detonator to be used shall possess an effective detonative strength as great as or greater than, that of one containing 15 grains of a composition consisting in every 100 parts by weight of 80 parts of fulminate of mercury and 20 parts of chlorate of potassium);
- (3) That the explosive has been made at the works of the National Explosives Company, Limited, at Upton Towans, Gwythian, in the county of Cornwall;
- (4) That the explosive is in all respects similar to the sample submitted to test on the 21st day of November, 1901;
- (5) That in addition to the marking on the outer package required by an Order of the Secretary of State, made under the Explosives Act, 1875, and in force for the time being, such outer package shall bear the words "As defined in the List of Permitted Explosives"; and, further, that each inner package shall be clearly marked with the words "Permitted Explosive, to be used only with not less than No. 6 detonator," and also with the name of the explosive, the name of the manufacturer, the date and place of manufacture, and the nature and proportion of the ingredients; and
- (6) That the explosive, if in a frozen condition, shall be thoroughly thawed in a safe and suitable manner before use.

Victorite, consisting in every 100 parts by weight of the finished explosive of not more than 27 parts and not less than 25 parts of thoroughly purified nitro-glycerine, with not more than 36 parts and not less than 32 parts of nitrate of barium, with not more than $41\frac{1}{2}$ parts and not less than $38\frac{1}{2}$ parts of wood-meal, provided that the wood-meal contains by weight not more than 15 per cent. and not less than 5 per cent. of moisture, with or without not more than half-a-part of sulphuretted benzol, and not more than half-a-part of carbonate of sodium and carbonate of calcium, or either of them, and with no other ingredient; the whole being uniformly incorporated, and of such character and consistency as not to be liable to exudation:

Provided—

- (1) That the explosive shall be used only when contained in a non-waterproofed wrapper of parchment paper;
- (2) That the explosive shall be used only with a detonator or electric detonator of not less strength than that known as No. 6 (*i.e.* the detonator or electric detonator to be used shall possess an effective detonative strength as great as, or greater than, that of one containing 15 grains of a composition consisting in every 100 parts by weight of 80 parts of fulminate of mercury and 20 parts of chlorate of potassium);
- (3) That the explosive has been made at the works of Nobel's Explosives Company, Limited, at Ardeer, in the county of Ayr;
- (4) That the explosive is in all respects similar to the sample submitted to test on the 20th day of August, 1901;
- (5) That in addition to the marking on the outer package required by an Order of the Secretary of State, made under the Explosives Act, 1875, and in force for the time being, such outer package shall bear the words "As defined in the List of Permitted Explosives"; and, further, that each inner package shall be clearly marked with the words "Permitted Explosive, to be used only with not less than No. 6 detonator," and also with the name of the explosive, the name of the manufacturer, the date and place of manufacture, and the nature and proportions of the ingredients; and
- (6) That the explosive, if in a frozen condition, shall be thoroughly thawed in a safe and suitable manner before use.

From this it will be seen that the gelnite explosives have been removed from the list. The ammonium nitrate explosives are generally regarded as the safest.

In order to ascertain to what extent the coal dusts from the collieries in the State are dangerous when shots of compressed blasting powder come in contact with them, the permission of the late Secretary for Mines was obtained to collect and send to the Home Office Testing Station at Woolwich, England, samples of coal dust from the largest collieries, and this was done during last year.

The authorities at the Testing Station were kind enough to have them tested, and sent the following report of the results:—

Experiments carried out at the Home Office Testing Station at Woolwich during the months of August and November, 1901, to ascertain whether various samples of coal dust from collieries in New South Wales were capable of causing an explosion when raised by the firing of a charge of blasting powder.

The method of testing.

A cannon of 2-in. calibre and with length of bore of 30 in. was placed with its axis vertical. A charge of two pellets of Curtis's and Harvey's blasting powder (145 grammes in weight) was inserted, and white pottery clay was well rammed on top of the charge to give a length of 9 in. of stemming. This clay is used for the various official tests at the Testing Station, and has been selected for the purpose on account of its purity, freedom from sand, and uniform character. It is obtained from the pottery works of Messrs. Doulton and Company under the following specification:—"The clay to lose not less than 7 per cent. and not more than 9 per cent. of its weight by gentle ignition, and to be of such grain that not more than 94 per cent. and not less than 90 per cent. pass through a sieve of ten meshes to the inch, and not more than 22 per cent. and not less than 20 per cent. pass through a sieve of twenty meshes to the inch."

The remainder of the bore was then filled with coal dust and a heap of dust 6 inches in height placed on the muzzle. The charge was fired with a low tension electric fuze.

The tests.

Two shots of blasting powder were fired with each sample of coal dust, and in every case an ignition of the dust took place, though with a varying degree of violence.

The ignitions appeared as a rule to commence about 6 ft. above the muzzle of the gun, but as the experiments were carried out in daylight, it was not possible to gauge the exact height. In some cases the flames appeared to be about 30 ft. in length and of about 4 ft. in diameter, and in other cases not more than about 10 ft. in length and of about a diameter equal to the length. There seems to be no satisfactory explanation of the variations. I have classified the explosions as mild explosion, explosion, and violent explosion. In the first case there was not complete combustion of all the dust, and the flame was somewhat obscured by the unburnt dust. Under the heading of explosion, I have included those cases in which the bulk of the dust was ignited; and under the heading of violent explosion, I have placed those ignitions in which the volume of flame was greater than in the two first cases. It is quite impossible to draw any hard-and-fast line between the three degrees, and, after all, the main point to be noted is that with all the samples of dust an explosion was obtained. In some samples there was a considerable amount of comparatively large grains of coal, and these grains fell to the ground in a shower after the finer dust had been exploded. On the whole, the dust seems to be of the same quality as that obtained in English coalmines as regards its sensitiveness to ignition under the conditions of the test.

I may add that this test is of a somewhat more severe nature than that originally instituted (but now abandoned) of firing a charge into an atmosphere of suspended dust.

A. DESBOROUGH, Capt.,
Officer-in-Charge, Home Office Testing Station.

No. of Shot.	Colliery.	Result.	No. of Shot.	Colliery.	Result.
1	Mount Pleasant	Explosion.	35	New Park	Explosion.
2	"	More violent explosion.	36	"	"
3	South Bulli	Violent explosion.	37	Pacific	Mild explosion.
4	"	"	38	"	"
5	South Clifton	Explosion.	39	Stockton	Explosion.
6	"	"	40	"	"
7	Coal Cliff	Mild explosion.	41	Hetton	"
8	"	"	42	"	"
9	Metropolitan	Explosion.	43	Co-operative	Very violent explosion.
10	"	"	44	"	Explosion.
11	Osborne Wallsend	"	45	Lambton	"
12	"	"	46	"	"
13	Zig Zag	"	47	West Wallsend	"
14	"	"	48	"	"
15	Oakey Park	Mild explosion.	49	Newcastle Company's A Pit	"
16	"	"	50	"	Violent explosion.
17	Bulli	Explosion.	51	Seaham	Mild explosion.
18	"	"	52	"	Explosion.
19	Corrimal	"	53	Greta	"
20	"	"	54	"	"
21	Mount Kembla	Violent explosion.	55	Wallsend	Violent explosion.
22	"	"	56	"	Explosion.
23	Bellambi	Mild explosion.	57	Burwood	"
24	"	Explosion.	58	"	"
25	Duckenfield	"	59	East Greta	"
26	"	"	60	"	"
27	Bloomfield	"	61	Dndley	Violent explosion.
28	"	"	62	"	"
29	Ebbw Vale (New Lambton)	Mild explosion.	63	Centenary	Explosion.
30	"	Explosion.	64	"	"
31	Wickham and Bullock Island	"	65	Waratah	"
32	"	"	66	"	"
33	New Winning	"	67	Brown's Colliery	"
34	"	"	68	"	"

5 Dec., 1901.

A. D.

From this it will be seen that all the dusts tested resulted in explosions more or less violent, and proves beyond doubt the necessity for thoroughly watering all dry and dusty places where shots are to be fired, and the advisableness of adopting the use of one of the "Permitted Explosives" and the electrical method of firing.

When shots are to be fired in dry and dusty places, it is not unusual to water the vicinity by means of sprinkling water from a bucket. This method does not always *thoroughly wet* the dust within 20 yards of the shot, the distance stated in general rule 12, and cannot be considered a satisfactory method. If the necessary supply of water cannot be obtained from pipes under pressure, then a good substitute may be found by using a water tub, and attaching to it a small force pump and hose, and by this means the most dangerous quality of dust, viz., that to be found on the roof and sides, can be thoroughly watered.

In some of the collieries there is very little water underground, and the surface supply for ordinary colliery requirements is frequently insufficient, as is evidenced during the present drought, when water is being taken by rail several miles for use in some of the colliery boilers.

The following extracts from the reports of the Imperial Inspectors with respect to "Permitted Explosives," etc., are of sufficient interest to include in this report:—

Extracts from the Imperial Inspector's Reports re Blasting and the Explosives in Coal Mines Order.

Taken from page 25 of the report of the North Staffordshire Inspector's Report for the year 1897.

The most striking feature in the Statistics of Mining Accidents for 1897, is the comparatively small loss of life caused by explosions. There were twelve fatal explosions during the year, resulting in only nineteen deaths. The number killed is considerably less than half the lowest previous annual record during the forty-seven years covered by the official statistics, and during that period the average loss of life by explosions has been 212 per annum.

The reasons for this great reduction in the loss of life by explosions are, I have no doubt, 1st:—The more general recognition of the fact that coal dust is the most dangerous element in colliery explosions, and a more intelligent appreciation of the conditions likely to bring coal dust into action as an explosive agent. 2nd:—The increased use of "safety explosives."

The pioneers of the "coal-dust theory" may congratulate themselves, not only on the general acceptance of that theory, but also on the fact that its recognition has already resulted in the saving of many lives, and much valuable property.

It is not to be anticipated that the death rate from explosions will, under existing conditions, be permanently maintained at the low level reached last year. Although the causes above indicated are likely to effect a marked reduction in the average yearly loss of life by explosions, it cannot be hoped that coal dust explosions, causing great loss of life, will not occur occasionally, so long as the radical source of the danger remains. Shot-firing is not the only means by which a coal dust explosion may be initiated, and it is known that even the safest of the new explosives are capable, under certain conditions, of igniting fire-damp or coal dust, or mixtures thereof.

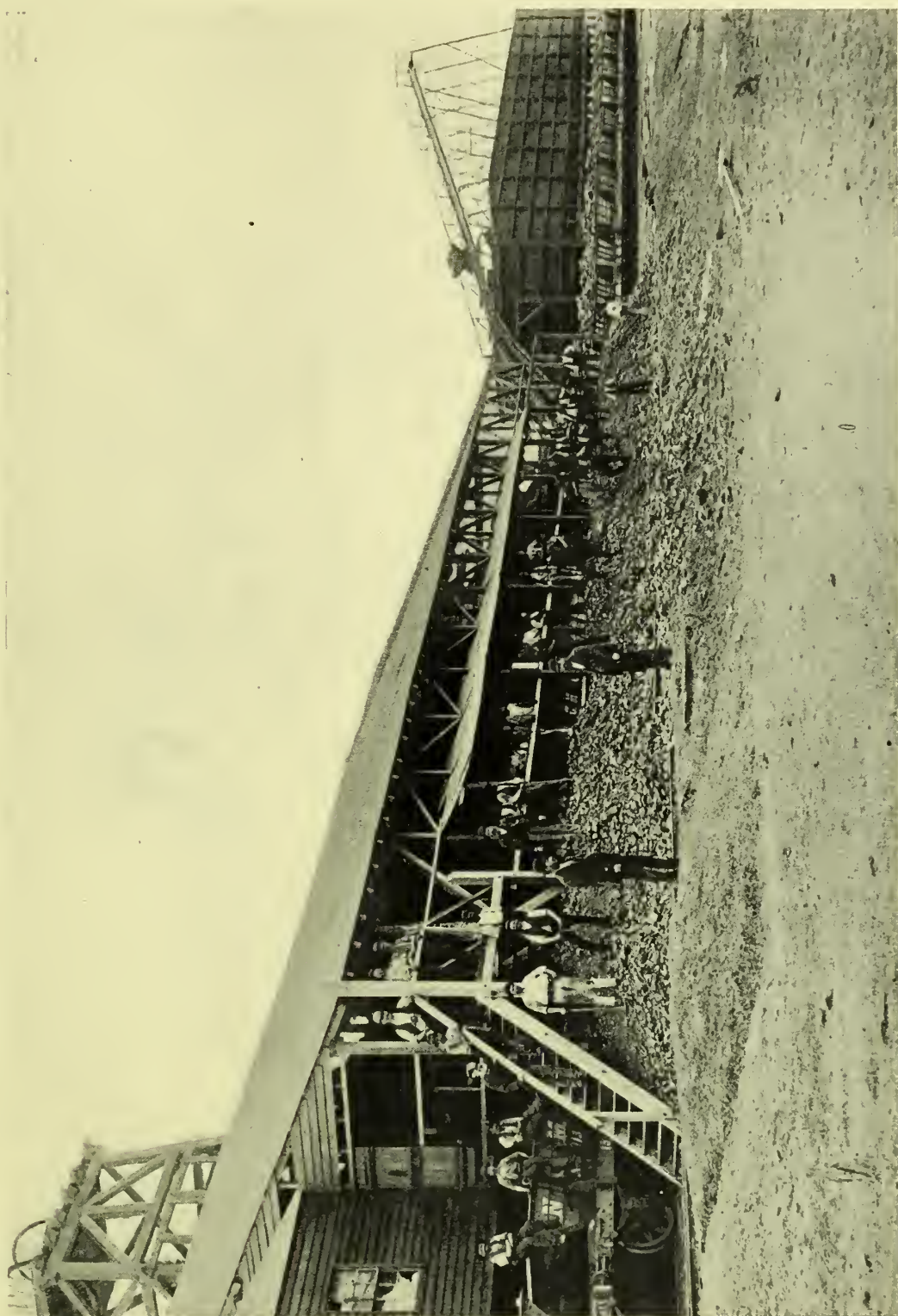
The Explosives Order under the Coal Mines Regulation Act, 1896, came into force on the 1st January, 1898, and it is yet too early to discuss the working of the order or its effect. It may, however, be useful, and tend to increase the effect of the order in saving life, to refer now to the "permitted explosives." It will be apparent to all who have studied the recent experiments and discussions on mining explosives at home and abroad, that the degree of safety requisite for admission to the list of permitted explosives, falls considerably below the standard previously considered necessary to constitute a "safety explosive." If, therefore, the increased safety which has already accrued from the use of safety explosives is to be maintained, the managers of fiery and dusty mines should select an explosive—not simply because it is a permitted explosive, but because it stands in the highest rank of safety. I should be sorry to see some of the permitted explosives used in the fiery and dusty mines of this district.

Taken from page 34 of the report of the South Durham Inspector's Report for the year 1897.

The Explosives in Coal Mines Order which created so much criticism in the northern counties has now come into force. As was anticipated, a certain amount of friction and antagonism was encountered at the outset which has not yet entirely subsided.

There is always some difficulty in changing from one system of working to another. Men who had been accustomed to use powder, were less at home with and understood less of the properties of the higher explosives, but I hope in a short time these difficulties will be overcome.

The



THE NEWCASTLE COAL MINING COMPANY'S B PIT, MEREWETHER.

(Near view.)

The effect of a high explosive with its more rapid combustion is very different to the slow reading or pushing qualities of gunpowder, and in some coal and stone the different duty performed of the two explosives is very marked, but experience of their use will in a great measure overcome this, and with proper care their use in coal mines cannot fail to have a beneficial effect in the cause of safety.

I have heard some complaints of the bad effects upon the men from breathing the gases resulting from the combustion of the high explosives, but in a reasonably well ventilated pit I do not think that this question need be taken seriously into consideration.

Electrical firing is without doubt the safest method, but it is accompanied by one element of danger, namely, the detonator, and too much care cannot be exercised with regard to them. They are very powerful, and with rough or incautious handling are liable to inflict very serious, or even fatal, injuries. I should like to see every charge of explosive and every detonator accounted for by the person to whom they are issued. It is a simple matter to arrange, a certain amount is given out to the responsible persons, and whatever is not used could be returned to the store at the end of the shift, and an account kept of what was made use of, including missed shots, &c.

Taken from page 16 of the report of the West Scotland Inspector's Report for the year 1898.

This Order does not apply to a large number of the collieries in the district. In a few cases where it did apply it was found that the owners had done nothing to carry out its requirements, but when this neglect was pointed out the matter was at once put right. I have not heard that the greatly increased cost of working the coal, which it was predicted would be the sequence of the introduction of this Order, has been realised in practice. I am informed that at one large colliery, where the shots are now all charged and fired by the shot-firers, the result has been an increased proportion of round coal.

Taken from page 35 of the report of the South Durham Inspector's Report for the year 1898.

There seems to be but little unanimity in opinion as to which of the permitted explosives is the best, and considerable chopping and changing has taken place in different mines with a view to getting the safest explosive; some on different occasions having given indications that they were not all that could be desired.

As an instance, some gas was ignited at a colliery in this district where electronite was in use; a hole had been drilled in the coal, and unknown to the men it had holed into a slip or open cavity about 18 inches or 20 inches in the coal. This, no doubt, contained a little gas; the shot was fired with an electric battery in the ordinary way, but only shook the coal without bringing it down, and when it was hewn off the coal was found to be on fire.

This is probably no more than any other explosive would have done under similar conditions, and simply proves what was well known before—that "safety" explosives are not always safe.

Some questions have arisen as to whether certain mines are sufficiently dry to come within the meaning of the Order, and it is to some extent a difficult question to answer. Recent experiments have, however, shown that dust in quite small quantities is quite as dangerous, if not more so, than when there is a large volume of it.

There is a natural reluctance on the part of the management to change a well-known explosive for another one requiring greater restrictions in its use, but when this fact becomes more generally known there will, I feel sure, be no question as to the action that will be taken.

Taken from page 23 of the report of the Manchester District Inspector's Report for the year 1898.

The Explosives in Coal Mines Order, in operation during the year 1898, has not given much trouble in this district. It was largely anticipated. It has only been necessary to institute proceedings in one case, a conviction being obtained for using gunpowder in a mine after fire-damp in dangerous quantity had been found.

Permitted explosives have been extensively used throughout the district for several years. Periodically have collected information which showed that their use has led to a reduction in the number of shots required in the mines, and as fuller experience of the power of the explosive was obtained a marked decrease in the weight of charges followed. It is quite true that in this district there is nothing like the amount of shot-firing required in some districts, still there is a fair amount of permitted explosives used. By the courtesy of the owners and managers, have been supplied with the number of shots fired in the year 1898 in this district, and have compiled the following table from the figures so supplied. In many, if not in most, a fairly accurate account has been obtained, in the case of permitted explosives, by taking the number of detonators used. In most of the mines a strict account is kept of the detonators used, those returned, missed shots, &c. This is very desirable, as tending to prevent detonators getting outside the mines into the hands of children and those not acquainted with their dangerous nature.

The permitted explosives in use in this district are: Ammonite, anvis, ardeer powder, bellite, carbonite, electronite, robruite.

The gunpowders on the permitted list have been experimented with in some mines; two informants say that in some cases showers of sparks and flame were produced, and in one other case an actual ignition of a feeder of gas occurred which was fortunately discovered, otherwise a very serious coal-fire might have been established, for this shot immediately preceded a three days' cessation from work.

Taken from page 17 of the report of the Liverpool District Inspector's Report for the year 1898.

This Order has now been in operation some eighteen months, and it has fulfilled none of the prophecies as to the disastrous effects which would follow its installation. The coal trade is better now than for years, and English coal—the quality of which it was foretold would be seriously damaged by the use of safety explosives in place of gunpowder—is apparently more appreciated now than ever it was. The destruction by detonators and fumes has not occurred; there has not been a single fatal accident in this district caused by a detonator, and in the Kingdom at large the deaths by accidents with explosives are fewer than in previous years, and the bulk of them have taken place in the mining districts where gunpowder is still largely used. As regards fumes, it is somewhat remarkable that the only complaint made to me about fumes during the year came from a mine where gunpowder was the explosive. Indeed, I think there can be no question now that experience has proved gunpowder to be by far the worst offender in this respect. The last gunpowder pit I inspected the fumes were so thick and blinding that the manager lost his way, and we had some difficulty in finding it again.

I am convinced that the opinion of the coal trade, if it could be obtained, would now be found to be overwhelmingly in favour of safety explosives: and so far as this district is concerned, I am satisfied that the chief employers could not be bribed to resort to gunpowder.

What has been the effect of the Order on the class of accident it was designed to mitigate, viz., explosions of fire-damp and coal-dust? It has proved a success beyond all expectation; and you, Sir, are to be congratulated on having initiated the legislation which has achieved such glorious results. The deaths from explosions of gas and dust for the last two years are a record; the two years together have only killed forty-six persons, a figure less than that recorded for any single previous year. The most favourable year was 1888, when forty-nine persons were killed; and taking any two previous consecutive years, the best were 1891 and 1892, when 174 lives were lost, as against forty-six for 1897 and 1898, thus we have apparently attained that which in the past has set mining skill and care at defiance.

No doubt there will still be people who will prove impervious to the logic of these facts, and they will tell us it is a mere coincidence, and should this immunity continue for the next five years they will still try to maintain that view.

Taken from pages 25 and 26 of the report of the North Staffordshire Inspector's Report for the year 1898.

The Explosives Order has now been in force for more than a year, and, so far as this district is concerned, no difficulty has arisen with reference to it; indeed, the Order did not here necessitate very great changes from what was the general practice before it came into operation, as "Safety Explosives" were already largely used in the district. It has been necessary in a few cases to object to the material used for stemming the shots as not being "non-inflammable," but this was under Section 5 (3) of the Coal Mines Regulation Act, 1896. The stemming objected to was clay or shale found in the mine and assumed to be "non-inflammable," but which on trial was found to contain more or less inflammable matter, and to flare up when crushed small and thrown on a fire.

So far as I am aware, the "permitted explosives" used in the district are chiefly of the older class known as "Safety Explosives," such as ammonite, bellite, carbonite, and westfalite. Gelignite is, or has been, used for stone drifts and staple pits, and in the entire absence of coal-dust and proper care as to fire-damp there is not much objection to its use but, in my opinion, it is a dangerous explosive to use where there is coal-dust. Towards

Towards the end of the year my attention was called to the behaviour of the "permitted explosive" Elephant Brand Gunpowder, a small quantity of which had been obtained for trial in Shropshire. I was told that two shots had been fired, and that sparks and flame were observed in each case. The fireman who fired one of these shots, containing a No. 3 cartridge, stated to contain high-grade gunpowder equivalent to 9 oz. of blasting powder, said that it caused a big blaze of red flame and a lot of evil-smelling smoke. The colliery manager afterwards fired a few testing shots, which also showed sparks and flame. The use of the explosive was given up.

With reference to explosives whose safety depends on the action of a cooling substance, such as is used in the Elephant Brand cartridges, the following passage from the Final Report of the last Royal Commission on Accidents in Mines may usefully be recalled:—"Suggestions have been put forward for the employment of particular solid preparations in conjunction with powder, with the idea that the heat to which they would be exposed upon the firing of the shot would cause them to evolve either vapour of water or other vapours of gases possessing the power of extinguishing fire, and thereby preventing the ignition of inflammable or explosive gas mixtures by blown-out shots. The authors of these suggestions have failed to appreciate the importance of time as a factor in the accomplishment of chemical decompositions of this character, and even in the liberation of mechanically-retained water by the action of heat. It must have escaped their attention in such experiments as they have witnessed, that portions of the materials composing the envelopes of powder charges, when they have been recovered after the firing of a gun or a blasting charge, often exhibit no symptoms of having been exposed to heat, although they may be in themselves very inflammable, or that wet clay, if used as tamping, is not found to have parted with its water to an appreciable extent when recovered after firing. In illustration of the effects which are confidently expected by sanguine inventors to be produced by the momentary exposure to the temperature of the heated powder-gases, of considerable masses of supposed extinguishing agents with which the charge is to be either surrounded or covered to a considerable height, the following may be usefully quoted from a recently published description by its inventor of the nature and supposed action of one of these nostrums for the extinction of the flame of gunpowder produced in shot-firing."

The report then goes on to quote a description of a method of using crystalized carbonate of sodium or soda crystals and other ingredients for stemming shots, and adds:—"These various changes and results, so ingeniously conceived, are developed with fair correctness and completeness upon paper. In actual practice, however, the great bulk of the 'compound,' if not the whole, would simply be scattered unchanged, the period of its exposure to heat being far too brief to bring about the predicted changes."

The good effect of the increased use of safety explosives is again shown in the statistics relating to explosions for the year 1893. There were only 12 fatal explosions, resulting in 27 deaths, the record of the previous year, which was by far the lowest on record, being 12 fatal explosions and 19 deaths.

Extract taken from page 20 of the report of the Midland Inspector's Report for the year 1893.

Application of the Order.—The most difficult part of the Order is how, when, and under what conditions, does it come into force into a mine. The finding of gas in such quantity as to be "indicative of danger" is a matter of opinion. It is true that the special rules require the officials to search for gas, and report the same when found, and such reports should be entered in the books, but I find the greatest difficulty in getting officials to admit that the gas they report as found was such as to be "indicative of danger," unless the gas is in such large quantity as to be actually dangerous. Therefore, if the official who found the gas and reported it will not admit that it was in such quantity as to be indicative of danger, how can the inspector, who did not see the same, speak as to its appearance. "Indicative of danger" does not mean "dangerous"; it is not necessary that a dangerous accumulation of gas should exist, but that gas is found in such quantity as to indicate a definite possibility or probability that dangerous accumulations might occur.

Taken from page 38 of the report of the South Durham Inspector's Report for the year 1893.

This year, the same as last, there have been a good many changes in the explosives used at the various mines, any which give unsatisfactory results being changed for one which, in the opinion of the officials, is safer or more efficient.

Some complaints reached me of flame and sparks being given off when blasting underground with oxalate. I procured some of the explosive from one of the mines from which the complaint emanated, and sent it up to the Government station at Woolwich to be re-tested, with the result that it passed the test entirely satisfactorily. Notwithstanding this, the company, not having confidence in it, introduced another of the permitted explosives in its place.

Taken from page 17 of the report of the Liverpool District Inspector's Report of 1899.

The good effect of the rules under this Order are still strikingly apparent; indeed it has proved to be the most fruitful for good of any legislation which has ever been applied to the mining industry. The aggregate number of deaths by fire-damp explosions throughout the Kingdom during the last three years only reach 100, against 327 for the best three consecutive years before the Order began to operate.

The new special test for explosives, which has been instituted this year by weeding out the doubtful explosives now on the permitted list, ought to keep us clear of any serious relapse.

Taken from pages 22 and 23 of the report of the Midland Inspector's Report for the year 1899.

I see no reason to modify the remarks made in my previous report as to the difficulties arising from the words "in such quantity as to be indicative of danger." In mines where the order is not in force, officials are apt not to pry too closely into holes and corners of a working place.

In one mine inspected by my assistant, and in which the Order was not in force, there was not a trace of gas reported as found for five months, yet when the mine was inspected gas was found in considerable quantity only 9 feet from the coal face, and which filled a large break in the roof for the length of the stall.

New Order.—A revised copy of the Order has been issued during the year (24th July, 1899) in which certain conditions are to be observed with respect to the control of detonators, which must in future be kept under the care of properly authorised persons in a securely locked case or box, separate from any other explosive, until about to be used.

During the year two samples of explosives have been sent by the owners of mines to Woolwich to be re-tested. No suspicion of their safety was entertained by the users of the explosive, but the samples were taken indiscriminately from the colliery magazine and sent for a re-test, the object being to fortify the manager's position in their use, no fault whatever being found with either the form of cartridge, the quality of the explosive, or its action. In one case ten shots were fired and no ignition occurred, and in the other case ten shots were fired and two shots ignited the mixture in the testing chamber.

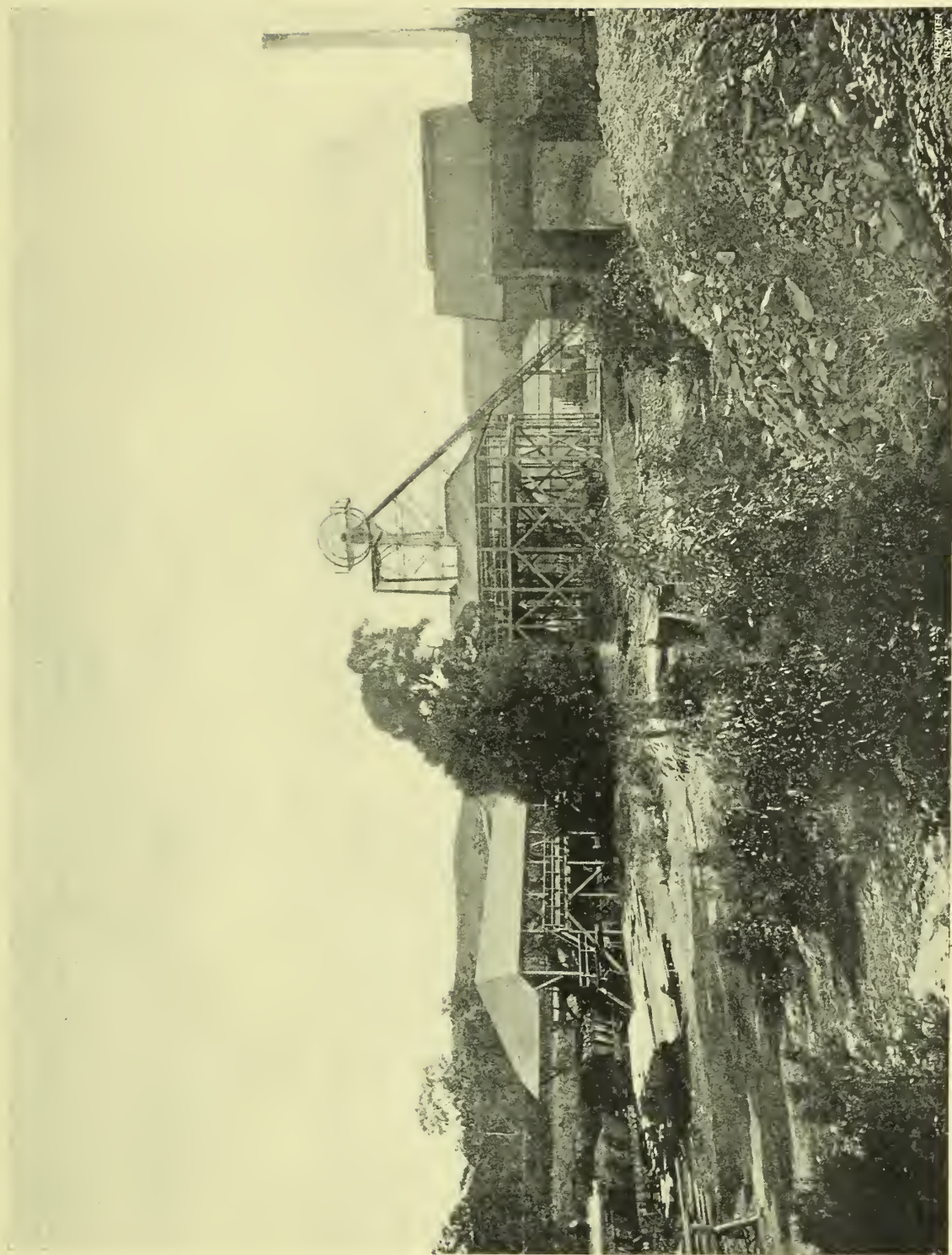
This is the second time that a permitted explosive, sent from my district, has fired when re-tested with samples taken from the colliery supply.

Some of the permitted explosives give me little confidence in their use should they ever be tested under conditions favourable for an explosion, namely, in a dry and dusty part of a mine and surrounded by an explosive mixture of fire-damp and air in the most explosive proportions, and, therefore, I warn managers that the employment of safety explosives in novise dispenses with the necessity for the precautions, found by experience, to be essential in coal mines. I do not know an explosive that can be relied upon as absolutely flameless, or an explosive which will detonate or deflagrate under any condition, with safety in an atmosphere of explosive mixture, and, it is probable, that as some of the recent explosives introduced depend upon their security by the cooling down of the products of the explosion, the relative weight of charge will increase their relative danger of ignition of an explosive mixture.

My experience with respect to the present list of permitted explosives and their use leaves no doubt in my mind that a special list of explosives, which shall distinguish between those that have barely passed the present test and those which can pass under more severe conditions, is absolutely necessary. The above-named re-testing and failure of two popular explosives, shows how near the line of safety we are travelling, for, if two shots out of ten fire the mixture, it is clear that such an explosive would not have been passed in the first instance had such failure occurred, and it would not have been placed upon the present list without further investigation.

I find that in some mines as much as 22 ounces of a permitted explosive is used for a single shot, and in many cases 16 ounces per shot is fired.

The proposed new test does not appear to me to be of any greater severity than what might occur in a mine, and certainly not greater than what is a desirable test in the selection of explosives for use in dangerous mines.



THE KILLINGWORTH COLLIERY, WEST WALLSEND.
(General view.)

UNDERGROUND HAULAGE ACCIDENTS.*

Nature of Accident.	No. of Fatal Accidents.	No. of Deaths.	No. of Non-fatal Accidents.	No. of Persons Injured.
While engaged as set riders, wheelers, drivers, &c. ....	.....	.....	23	23
While engaged in coupling or uncoupling .....	... ..	.....	3	3
While engaged as roadmen, oilers, &c.	1	1	1	1
While walking in-bye or out-bye to or from their work.....	1	1	3	3
In other ways	1	1	6	6
Totals.....	3	3	36	36

* These include all accidents on inclined planes, and by trams and tubs (see table headed "Summary of Fatal and Non-fatal Accidents, classified according to place and cause").

The number of accidents and of deaths caused by them under this head is the same as in the previous year, while the number of non-fatal accidents is four less than in the previous year, and caused injuries to four fewer persons. It does not appear that any further notes in connection with these accidents are necessary, as all the particulars are to be found in the lists of fatal and non-fatal accidents. None of the fatal accidents appear to have been caused by breach of any of the special rules in force at the collieries.

ACCIDENTS ON SURFACE RAILWAYS OR TRAMWAYS.

	No. of Fatal Accidents.	No. of Deaths.	No. of Non-fatal Accidents.	No. of Persons Injured.
While engaged in moving waggons	1	1	4	4
While engaged in coupling or uncoupling waggons .....	.....	.....	1	1
Run over while passing along or across railways or tramways.....	.....	.....	2	2
Crushed between waggons or between waggons and structures .....	.....	.....	.....	.....
In other ways .....	.....	.....	2	2
Totals.....	1	1	9	9

The number of deaths under this heading are two less than in the previous year, whilst the number of non-fatal accidents and persons injured are each three less than in the previous year.

SECTION IV.

LIST OF PROSECUTIONS.

LIST OF PROSECUTIONS BY DIRECTION OF THE SECRETARY FOR MINES, 1901.

Name of Mine.	Description of Offender.	Contravention.	Result of Trial.	Penalty.	Costs.
Rugby.....	Manager ...	General Rule 4—Not having inspections made before commencing work under the conditions imposed by said rule—not recording result of such inspections in a book, &c.	Conviction on first charge: second charge withdrawn.	£ s. d. 1 0 0	£ s. d. 0 4 10
Centenary	Manager ...	General Rule 14—Not providing refuge holes on an engine plane operated in said mine.	Conviction.....	5 0 0	0 4 10
South Greta	Owner and manager.	Section 29 (1)—Failing to report an accident to Clyde Senior.	Conviction.....	0 1 0	0 7 0 and £1 1s. medical expenses.
Forris.....	Manager ...	Breach of Section 34.....	Not proceeded with.		

LIST OF PROSECUTIONS BY OWNERS, &c., AGAINST WORKMEN DURING 1901.

Name of Mine.	Description of Offender.	Contravention.	Result of Trial.	Penalty.	Costs.
East Greta	Miner	General Rule 12—unramming a shot which had missed fire.	Conviction ...	£ s. d. 0 5 0	£ s. d. 0 4 10
West Wallsend	do	Special Rule 48—not placing danger signal in case of a miss shot.	do ...	1 0 0	0 4 10
Do	do	Special Rule 15—entering part of mine without authority.	do ...	1 0 0	0 4 10
Waratah	do	Special Rule 43—stemming hole with lamp on hat	do ...	2 0 0	0 5 6
Do	do	General Rule 12—stemming with iron drill	do ...	2 0 0	0 5 6
New Lambton	do	General Rule 71—stemming blasting hole with a naked light on his head.	do ...	1 0 0	0 5 6
Burwood	Wheel.r ..	Special Rule 28—going into a part of the mine other than where he was employed without orders.	do ...	0 1 0	0 4 10
Killingworth	Miner	Special Rule 46—taking pipe into mine	do ...	0 10 0	0 5 6
Do	do	Special Rule 46—taking pipe into mine	do ...	0 10 0	0 5 6
Do	do	Special Rule 46—having matches in his possession	do ...	0 10 0	0 5 6
Dudley	do	Special Rule 75—taking matches into mine	do ...	0 10 0	0 4 10
Do	do	Special Rule 75—taking matches into mine	do ...	0 5 0	0 4 10
Metropolitan	do	General Rule 23—neglecting to set sprags where required.	do ...	0 5 0	0 4 10
Do	do	General Rule 23—neglecting to set sprags where required.	do ...	0 5 0	0 4 10
Do	Deputy	Special Rule 42—neglecting to inspect all old working places.	do ...	0 5 0	0 4 10
Do	Miner	General Rule 23—neglecting to set sprags where required.	do ...	0 5 0	0 4 10
Do	do	Special Rule 211—carrying a match into mine	do ..	0 5 0	0 4 10
Do	do	Special Rule 230—taking a cigarette into mine	do ...	0 5 0	0 4 10
Do	do	Special Rule 230—carrying a tobacco pipe	do ...	0 2 6	0 4 10
Do	do	Special Rule 211—carrying matches into mine	do ...	2 0 0	0 4 10
Do	do	Special Rule 211—carrying matches into mine	do ...	0 5 0	0 4 10
Do	do	Special Rule 211—carrying matches into mine	do ...	0 5 0	0 4 10
Do	do	Special Rule 211—carrying matches into mine	do ...	0 5 0	0 4 10
Do	do	Special Rule 211—carrying matches into mine	do ...	0 5 0	0 4 10
Do	do	Special Rule 211—carrying matches into mine	Dismissed on a technical point.	.....	.....
Do	do	Special Rule 211—carrying matches into mine	Conviction ...	1 0 0	0 4 10
Do	do	Special Rule 211—carrying matches into mine	do ...	0 5 0	0 4 10
Do	do	Special Rule 211—carrying matches into mine	do ...	0 5 0	0 4 10
Do	do	Special Rule 211—carrying matches into mine	do ...	0 10 0	0 4 10
Do	Wheeler ...	Special Rule 103—leaving doors open	do ...	0 2 6	0 4 10
Do	do	Special Rule 211—carrying tobacco pipe	do ...	0 5 0	0 4 10
Do	do	Special Rule 103—leaving doors open	do ...	0 5 0	0 4 10
Do	Deputy	Special Rule 58—not inspecting part of district	do ...	0 10 0	0 4 10

With reference to the appeal to the Privy Council in connection with the Dudley Colliery case, appended hereto is a short history of the case, together with the judgment of the Council.

Case of Humble v. Humphreys.

This case was tried in the Newcastle Court two years ago for an alleged breach of the 38th section of the Coal Mines Regulation Act. The Company, represented by Mr. Humphreys (the Dudley Colliery Co.), decided to pay for the coal won by the miners at so much per yard instead of so much per ton, and it was contended that this payment by yardage was a breach of the Act. The local Police Magistrate decided in favour of the miners, *i.e.*, that it was a breach of the Act.

The point taken in the case at the local Court by Mr. Want, K.C., who appeared for the defendant, was that the wages to be paid to the miners did not depend upon the amount of mineral gotten by them, but only according to the number of yards they drove in the bords, and for this they were paid, and not for the weight of coal gotten. The Act, he contended, contemplated the payment by other methods than by weight, but the local Magistrate, Mr. Payten, decided against Mr. Want's contention.

The section of the Coal Mines Regulation Act under which the prosecution took place is as under:—

PAYMENT OF PERSONS EMPLOYED IN MINES BY WEIGHT.

38. (1) Where the amount of wages paid to any of the persons employed in a mine depends on the amount of mineral gotten by them, those persons shall be paid according to the actual weight gotten by them of the mineral contracted to be gotten, and the mineral gotten by them shall be truly weighed at a place as near to the pit mouth as is reasonably practicable:

Provided that nothing in this section shall preclude the owner, agent, or manager of the mine from agreeing with the persons employed in the mine that deductions shall be made in respect of stones or substances other than the mineral contracted to be gotten, which shall be sent out of the mine with the mineral contracted to be gotten, or in respect of any tubs being improperly filled in those cases where they are filled by the getter of the mineral or his drawer, or by the person immediately employed by him, such deductions being determined in such special mode as may be agreed upon between the owner, agent, or manager of the mine on the one hand, and the persons employed in the mine on the other, or by some person appointed in that behalf by the owner, agent, or manager, or (if any) check-weigher is stationed for this purpose as hereinafter mentioned) by such person and such check-weigher, or in case of difference by a third person to be mutually agreed on by the owner, agent, or manager of the mine on the one hand, and the persons employed in the mine on the other, or in default of agreement appointed by a Chairman of a Court of General or Quarter Sessions within the jurisdiction of which any shaft of the mine is situate.

(ii) If any person contravenes or fails to comply with, or permits any person to contravene or fail to comply with this section, he shall be guilty of an offence against this Act; and in the event of any such contravention or non-compliance by any person whatsoever, the owner, agent, and manager of the mine shall each be guilty of an offence against this Act, unless he proves that he had taken all reasonable means by publishing and to the best of his power enforcing the provisions of this section to prevent the contravention or non-compliance.

(iii) Nothing in this Act shall be held to authorise or give any power to any owner or manager of a mine to pay miners by the method known as the standard weight system, and from and after the commencement of this Act that system shall be and is hereby abolished.

(iv)

(iv) Where it is proved to the satisfaction of the Minister, in the case of any mine or class of mines employing not more than twenty persons under ground, to be expedient that the persons employed therein should, upon the joint representation of the owner or owners of any such mine or class of mines and the said persons, be paid by any method other than that provided by this Act, such Minister may, if he think fit, by order, allow the same either without conditions or during the time and on the conditions specified in the order.

Mr. Want held that the owner of a colliery could not be compelled to pay by weight under the law if he prefers to pay by day-work or measurement.

The Company, through its manager, Mr. Humphreys, appealed to the Supreme Court, and the Magistrate's decision was reversed.

The Minister of the day, Mr. Fegan, feeling that the question was an important one, and should be authoritatively settled, decided that the case should be referred for the final opinion of the Privy Council.

JUDGMENT of the Lords of the Judicial Committee of the Privy Council on the Appeal of William Humble v. Hugh Humphreys from the Supreme Court of New South Wales, delivered 30th November, 1901.

Present at the hearing : Lord Macnaghten, Lord Shand, Lord Davey, Lord Robertson, Lord Lindley.
(Delivered by Lord Robertson.)

On 29th December, 1899, Mr. Charles Newton Payten, a Stipendiary Magistrate for the Police District of Newcastle, in the State of New South Wales, on two informations by the appellant, who is Inspector of Collieries, convicted the respondent of having contravened the 38th Section of the Coal Mines Regulation Act 1896, of New South Wales. Special cases having been required by the appellant were stated by the Stipendiary Magistrate for the opinion of the Supreme Court. The cases were remitted to the Magistrate with the opinion of the Court thereon that his determination was erroneous in point of law. The determinations on both the two informations (of which one applied to one pair of workmen and another to another) were the same, the questions determined being identical.

The offence charged was that the men named in the informations having been on the dates alleged persons employed in a mine to which the Coal Mines Regulation Act of 1896 applied, to wit the Dudley Colliery in the State of New South Wales, and in which mine the amount of wages paid to those persons did on those dates depend on the amount of mineral gotten by them, did fail to comply with the provisions of the 38th section, sub-section 1, of the Act, in that those persons were not paid according to the actual weight gotten by them of the mineral contracted to be gotten, contrary to the Act in such case made and provided. The New South Wales Act thus founded on is, so far as its enactments bear on the present question, an exact reproduction of the (British) Coal Mines Regulation Act, 1887. The question upon which this appeal turns is really whether, in the case of the miners named in the information, the amount of wages paid to them depended on the amount of the mineral gotten by them.

The facts are entirely undisputed. The men were employed in a coal mine. The agreement under which the men worked was in the following terms :—"That they should receive payment by measurement for work done by them as miners in the said mine at the following rates, viz., 23s. per lineal yard for a bord of 8 yards, and 5 ft. 10 in. high, rising or falling 3d. per yard for every inch in thickness ; wages to be paid fortnightly."

Prima facie, and according to the terms of this agreement, the remuneration of the men depends on the yard of excavation. It is important to observe what was excavated and how the material excavated was dealt with ; and the following propositions are established, in so many words, in the evidence. The excavation went straight through the material encountered, taking everything that came on. The line of excavation is a direct line, minerals or no minerals. The same wages were paid through stone or other material. The men are paid the same rate irrespective of what is hewn or taken out. "There is no difference, it would be the same as sinking a well." The material thus excavated and thus paid for was dealt with in the following manner :—The dirt was thrown back into the bords, and the coal filled into the skips by the men and sent out of the mine by them. But the mineral thus sent out of the mine by the men was not weighed at all, nor is coal ever weighed at this colliery for fixing wages.

On these facts, their Lordships find it impossible to hold that the amount of wages paid to these men depended on the amount of the mineral gotten by them. The amount of their wages depended on what is, in substance as well as in conception, a different criterion, viz., the amount of work done ; and it was independent of the amount of excavation, inasmuch as, more or less, certainly in greater or less degree, the more excavation the more mineral. But precisely the same reasoning would prove that payment by time was payment dependent on the amount of mineral gotten ; for again, the more time spent the more mineral gotten.

It was argued that in this particular colliery the proportion of stone to coal was very small, being only about 6 per cent. of stone to 94 per cent. of coal in the total output. But this is of course an average, and not a constant proportion ; and the evidence showed that men producing the most coal often get the smaller wages.

It is plain on the face of the section alleged to have been contravened and the relative sections that they are enacted for the protection of the miners against systems of calculating the amount of mineral gotten which involved risk of unfairness to men whose wages depended on such calculation. Their Lordships' ground of decision being that the section does not apply, it is unnecessary to say more than that it is satisfactory to observe that the system in force in this colliery does not seem to give occasion for any of the evils sought to be provided against. The measurement by yard is necessarily done, not above ground and in the absence of the miner, but in the mine, with themselves looking on and checking the measurement. No controversy can arise as to the material proper to be computed, for everything excavated is equally computed.

From the facts of the case it is manifest that the question now decided is wholly different and apart from those which have been under consideration in the several cases cited at the Bar. In all those cases the men were paid by weight, and the dispute was about the mode of computing the weight and the proper deductions. The only bearing of the decisions on the present case is in the observations of the eminent Judges on the true meaning of the section taken as a whole, and their Lordships have the satisfaction of finding that these remarks are entirely in harmony with the conclusion now arrived at.

Their Lordships have only further to observe that the argument of the appellant is in no wise furthered by the exemption clauses 38 (iv.) and 40 (vii.) for these are on the face of them merely exceptions from the enacting part of section 38. If the hypothesis fails on which the enactment proceeds, the whole argument comes to the ground.

Their Lordships will humbly advise His Majesty that the appeal ought in each case to be dismissed, and the orders of the Supreme Court be affirmed. The appellant will pay the costs of the appeal.

SECTION V.

GENERAL REMARKS.

TRADE.

THE coal trade generally, as shown by the out-put and exports was in a flourishing state, although a considerable falling off in the export trade from Newcastle was observed during the latter half of the year. The selling price for best Newcastle coal is at present nominally 11s. per ton f.o.b., but it is generally thought that in many cases lower prices than this are being accepted. In consequence of the depression in the metal markets, the coke trade has fallen off to a considerable extent, and, following that, more small coal has been thrown upon the market.

SYDNEY HARBOUR COLLIERY, BALMAIN.

DURING the year, ended 31st December, 1901, the Birthday shaft was sunk from 2,210 feet to 2,937 feet 5½ inches and walled with brickwork from 2,156 feet to 2,816 feet 5 inches.

The permanent chimney stack was completed and put to work during the year. It is 193 feet high and has a minimum diameter of 8 ft. 2 in.

The permanent ventilating fan was started early in December. It is of the Walker indestructible type, its diameter is 24 feet and width 8 feet, and is guaranteed to produce a ventilating current of 400,000 cubic feet of air per minute with 4½-inch water-gauge. The engines for driving this fan are of the compound

compound, horizontal type, having cylinders 19 inches and 25 inches diameter by 4 feet stroke. The fan is rope-driven from the engines, eleven cotton ropes being provided. The driving wheel on the crank shaft of the engines is 18 feet diameter, whilst the driven wheel on the fan shaft is 9 feet in diameter.

The following report, kindly supplied by the manager, Mr. J. L. C. Rac, on the coal seams recently struck in the Birthday shaft at this colliery, and review of the situation as it now is, and of the prospects which may reasonably be looked for, will, no doubt, prove of interest to the mining community.

Upper seam.—At a depth of 2,880 feet from the surface a seam was met with, consisting of 2 ft. 4 in. of bituminous and splint coal, 3 feet to 3 ft. 2 in. of very dark, jointy, carbonaceous shale, 2 inches of inferior splint coal, and 6 to 8 inches of bituminous and splint coal, the total thickness of the three bands being 6 ft. 2 in. This seam has a dip of 1 in 40, bearing N. 75 degrees E.

Middle seam.—At a further depth of 29 ft. 11 in. (namely, 2,916 ft. 1 in. from the surface), a second seam was met with, consisting of 1 ft. 8 in. of bituminous coal. This seam has a dip of 1 in 17, bearing N. 47 degrees E.

Lower seam.—At a further depth of 15 ft. 10 in. (namely, 2,933 ft. 7 in. from the surface), a third seam was met with, consisting of 3 inches of black shale, 3 inches of cannel coal and 8 inches of carbonaceous clay shale, with thin layers of bituminous coal, the total thickness of the three bands being 1 ft. 2 in. This seam has a dip of 1 in 11, bearing N. 13 degrees E.

It will be seen from the figures quoted, that the total thickness of coal contained in these three seams is from 4 ft. 11 in. to 5 ft. 1 in., that of the dark carbonaceous shales being from 3 ft. 11 in. to 4 ft. 1 in.

Comparison of seams found in the shaft, with those proved in the Cremorne and other bores.—Throughout the sinking of the shaft, the strata met with above the upper coal seam, showed a marked similarity to those passed through in the No. 2 Cremorne bore, and the upper seam was struck only 22 ft. 7½ in. lower in the shaft than in the bore, the depths being measured from low-tide level in Sydney Harbour. This, alone, is sufficiently clear evidence that the roof of the upper seam in the shaft is identical with that of the coal at Cremorne, which is, undoubtedly, the main Bulli seam. There is, however, in addition to this, the evidence afforded by the fossil plants found in the shales immediately overlying the upper seam in the shaft, one species being peculiar to the measures immediately overlying the Bulli seam.

Although in the Cremorne bore, the seam was found in one thickness of 10 ft. 3 in., in the bores put down at Heathcote and Holt-Sutherland two seams were found, separated in each case by fully 60 feet of rock; the thickness of the two seams being approximately the same as that of the single seam at Cremorne. In the bore put down at Liverpool three seams were found, the rock separating the upper and middle seams measuring 12 ft. 8 in., whilst there was a separating band of 74 ft. 5 in. of rock between the middle and lower seams. The three seams at Liverpool had an aggregate thickness of fully 9 feet of coal. The theory is that these seams had united near or under Sydney, thus forming the one thicker seam proved by the Cremorne bore, and there cannot, I think, be any doubt as to its accuracy.

In the case of our shaft, when we first found that the seam was split up, we formed the opinion that the balance of the seam might be met with under somewhat similar conditions to those proved by the bores named. At the same time, it was not expected that the rock separating the seam would be so thick as in these bores.

It was, therefore, decided, when the shaft had reached a depth of 2,937 ft. 5½ in., that sinking should be suspended and the cheaper method of boring adopted for the purpose of proving the underlying measures. This bore was carried down a depth of 76 ft. 9 in. (or to a total depth of 3,014 ft. 2½ in. from the surface), passing through a band of splint coal about 9 inches thick at a depth of 2,990 ft. 3½ in., and a band of bituminous coal about 1 foot thick at a depth of 3,007 ft. 7½ in. from the surface. It will be seen from the foregoing figures that the measures have been proved by sinking and boring to a depth of 134 ft. 2½ in. below the top of the upper coal seam, and the aggregate thickness of the seams and bands of coal met with is from 6 ft. 8 in. to 6 ft. 10 in.

It is evident that for some distance round our shaft the main seam has been split up into a number of thinner ones. Many cases could be cited where coal seams have been found to be locally subdivided, and it is very probable that in our case the trouble will be found to be only local. Indeed, if the rate and bearing of the dip of the seams continue, as observed in the shaft, they will re-unite and form one thick seam at a distance of about 300 yards from the shaft.

As it was, in any case, our intention to leave an unworked pillar of coal for the support of the shafts, having a radius of 375 yards from a point situated centrally between the Birthday and Jubilee shafts, it will be seen that if the coal seams re-unite within the distance named, the position is by no means as disappointing as it appears.

At our request a joint report on the subject was made by Professor David (of Sydney University) and Mr. Pittman (Government Geologist), and I am pleased to say that their opinions coincide with those expressed in this report, and that they fully anticipate that the splitting up of the seam in our shaft will be found to be only local. You will, I am sure, be glad to learn that, in the seams met with, the quality of the coal is very good.

In conclusion I may point out that, at the present time, the shaft is being bricked from the bottom up to the level of the last completed section, and that, when this work is finished, it is our intention, with the approval of the London Board, to drive on the upper seam so as to reach the point where the seams are expected to re-unite.

VENTILATION.

During the year ventilating fans have been started at East Greta and Sydney Harbour collieries, and they are being erected at two other collieries, one in the Northern, the other in the Southern district.

In many cases, where the ventilation is produced by furnaces, great advantage would accrue by the adoption of fan ventilation, but the initial expenses in connection with the system appear to deter colliery owners and managers from adopting it.

COMPLAINTS.

Several complaints have been received during the year—mostly anonymous—and all have been investigated and reported upon.

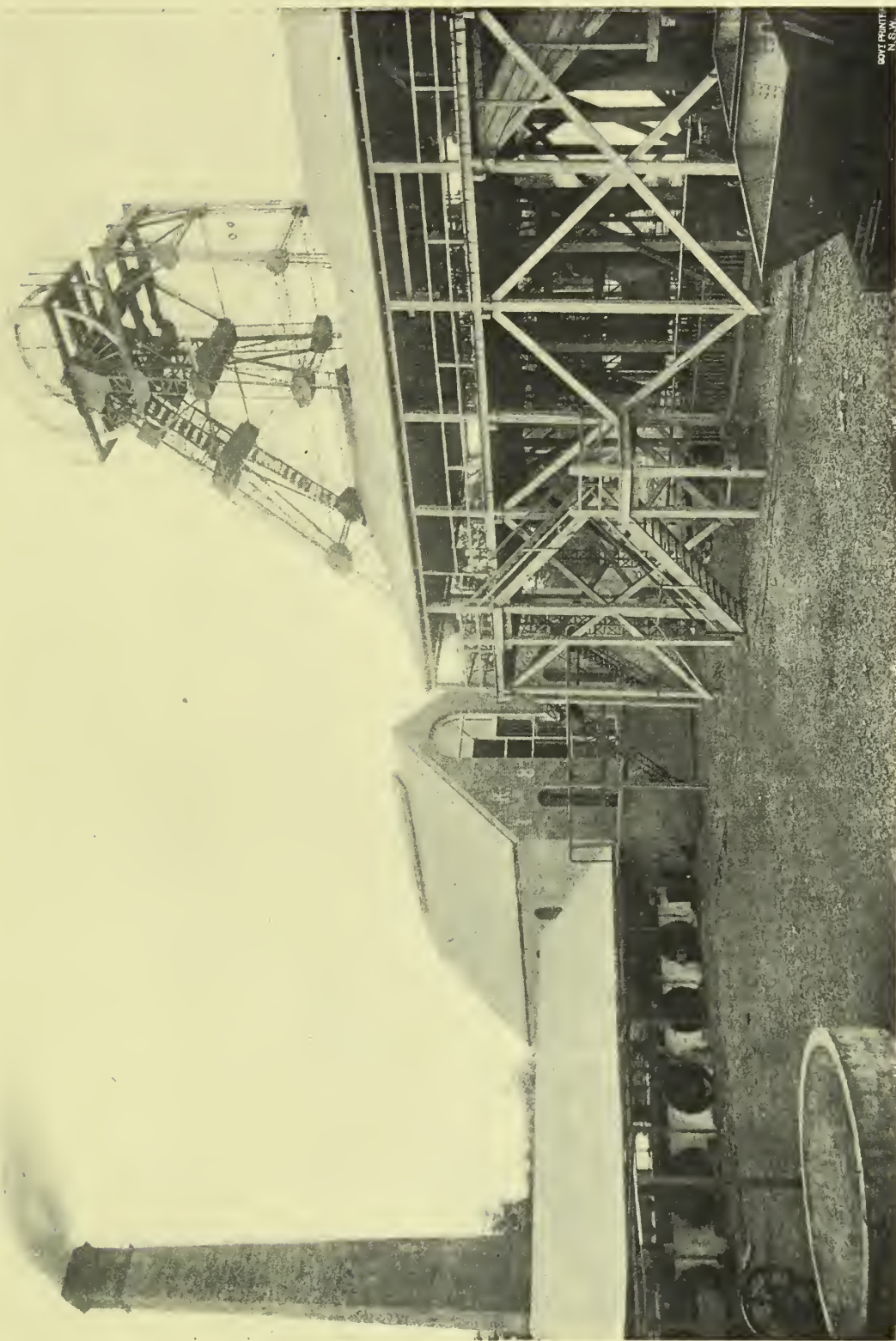
GENERAL RULE 39.

This rule gives the persons employed in a mine power to appoint two of their number, or any two persons, not being mining engineers, who are practical working miners, to inspect the mine once at least in every month on their behalf. The management is required to afford persons so appointed every facility, and they are required to make a report of their inspection in a book to be kept at the mine; and if the report states existence of any danger, the management is required to send a copy to the inspector of the district.

During the past year, in the Northern district, advantage has been taken of this rule in the case of all the larger collieries. Mr. William Bower, late President of the Colliery Employees' Federation, was elected to act in the capacity of inspector for the Northern district, in conjunction with a local inspector at each colliery. The system so far appears to work satisfactorily, and it is well that the workmen should avail themselves of the privileges afforded by it. In the Southern district, however, few inspections have been made, and in the Western district I am not aware that the workmen have taken any advantage of the rule.

GENERAL RULES UNDER COAL MINES REGULATION ACT, AND SPECIAL RULES IN FORCE AT THE COLLIERIES.

At some of the collieries, it is satisfactory to note, frequent discussions take place between the management and their officials as to the best manner in which the General and Special Rules may be carried out; and colliery managers generally would do well if they occasionally called their officials together and discussed with them the General Rules, and more particularly the Special Rules, applicable to their duties, with a view to assist the officials in the discharge of their duties, and insuring better discipline in the mines.



THE KILLINGWORTH COLLIERY.
(Showing Engine House, Head Gear, and Boiler Shed.)

A few particulars with reference to the production of coal, &c., in various countries, will, no doubt, be of interest to the mining community. They are taken from a Return issued by the Board of Trade in June, 1901 :—

The following statement shows what has been the production of coal in the five principal coal-producing countries of the world in the years 1898, 1899, and 1900 :—

Years.	United Kingdom.	Germany.	France.	Belgium.	United States.
	Tons.*	Tons.†	Tons.†	Tons.†	Tons.*
1898	202,055,000	96,310,000	31,826,000	22,088,000	196,406,000
1899	220,095,000	101,640,000	32,256,000	22,072,000	226,554,000
1900	225,181,000	103,225,000	32,587,000‡	23,352,000‡	245,422,000
* Tons of 2,240 lb. † Metric tons of 2,204 lb. ‡ Provisional figures.					

It will be seen that the amounts produced in 1900 were in all cases greater than in the preceding year, the increase in the production of the United States being especially noteworthy. The production of the United States has for the last two years exceeded that of the United Kingdom. The production of Germany represents less than half, and that of France and Belgium together about a quarter of that of the United Kingdom.

The total known coal production of the world is about 650 million tons per annum, of which the United Kingdom produces rather more than a third, and the United Kingdom and the United States together account for nearly three-quarters.

The following statement shows the average value per ton of the coal produced taken at the pit's mouth, in the five above-mentioned countries, in the year 1899 :—

United Kingdom.	Germany.	France.	Belgium.	United States.
Per ton. s. d. 7 7	Per ton. s. d. 7 9½	Per ton. s. d. 9 11½	Per ton. s. d. 9 11½	Per ton. s. d. 4 8½

These averages are in all cases higher than in 1898, but the rise in price was much greater in the United Kingdom than in the other countries dealt with, the average value nearly approaching that of Germany, where prices in recent years had been about 1s. higher than in the United Kingdom.

The figures for 1900 can only be given in the case of the United Kingdom, Germany, and the United States, for which they were 10s. 9¾d., 8s. 10d., and 5s. 5½d. respectively.

The relative prices of coal in the United Kingdom and the United States now and ten years ago may be instructively compared. This is done in the following table, where figures are given for the three years 1888 to 1890 and 1898 to 1900 :—

Years.	United Kingdom.	United States.	Years.	United Kingdom.	United States.
	Per ton. s. d.	Per ton. s. d.		Per ton. s. d.	Per ton. s. d.
1888.....	5 0½	6 0	1898	6 4½	4 5
1889.....	6 4½	5 3½	1899.....	7 7	4 8½
1890.....	8 3	5 2½	1900	10 9¾	5 5½

In comparing these figures, it must be borne in mind that many circumstances, such as the quality of the coal mined, improved machinery, nearness to the surface, the nature of the soil, &c., affect the average value at the pit's mouth, in addition to any difference there may be in the cost of labour.

The output of British India in 1899 amounted to 4,937,160 tons, or more than double the figures of ten years ago. The increase has been continuous since 1885. The average value of this coal ranged low, being about 4s. 2½d., or only ½d. per ton more than in 1898.

The following statement shows what was the production of coal in the principal British colonies and possessions in the year 1899. The amounts are in every case, as in other tables dealing with the British colonies and possessions, stated in tons of 2,240 lb., the figures for Canada and Cape Colony having been converted :—

New South Wales.	Victoria.	South Australia.	Western Australia.	Queensland.	Tasmania.	Total Australia.	New Zealand.	Canada.	Cape Colony.	Natal.
Tons. 4,597,000	Tons. 262,000	Tons. Nil.	Tons. 54,000	Tons. 494,000	Tons. 43,000	Tons. 5,450,000	Tons. 975,000	Tons. 4,506,000	Tons. 186,000	Tons. 329,000

It will be seen that New South Wales, with an output of four and a half million tons, furnishes over five-sixths of the total coal production of Australia. The output of Australia as a whole, that of Canada, and that of Cape Colony were in 1899 higher than any previously recorded. In Natal there was a falling off, presumably owing to the outbreak of the war in South Africa. The Transvaal is not included above, nor are figures obtainable for 1899. In 1898 its coal production amounted to nearly two million tons.

The average value at the pit's mouth of coal produced in the British colonies in the year 1899 is shown in the following statement :—

New South Wales.	Victoria.	Western Australia.	Queensland.	Tasmania.	Total Australia.	New Zealand.	Canada.	Cape Colony.	Natal.
Per ton. s. d. 5 9	Per ton. s. d. 8 8	Per ton. s. d. 9 7	Per ton. s. d. 7 1	Per ton. s. d. 7 11	Per ton. s. d. 6 1	Per ton. s. d. 10 0	Per ton. s. d. 9 1	Per ton. s. d. 15 9	Per ton. s. d. 8 6

The average value of the coal produced was lower than in the Mother Country in New South Wales and Queensland, but higher in all the other colonies.

The

The coal-producing countries which import coal in excess of the amount they export are Russia, Sweden, France, Spain, Italy, and Austria-Hungary, whilst the British colonies and possessions which do so are Canada, Victoria, South Australia, Western Australia, Queensland, Tasmania, New Zealand, the Cape Colony, and British India. The other minor British colonies are nearly all importing countries. The following statement shows the excess amount of coal imported into the above-mentioned countries and colonies in the year 1899:—

	Imports.	Exports.	Excess of Imports.		Imports.	Exports.	Excess of Imports.
	Tons.	Tons.	Tons.		Tons.	Tons.	Tons.
Russia	4,459,000	15,000	4,444,000	South Australia	438,000	47,000	391,000
Sweden.....	3,135,000	†	3,135,000	Western Australia ...	127,000	44,000	83,000
France	13,087,000	2,531,000	10,556,000	Queensland	30,000	9,000	21,000
Spain	1,783,000	8,000	1,775,000	Tasmania	53,000	3,000	50,000
Italy	4,860,000	21,000	4,839,000	New Zealand.....	100,000	94,000	6,000
Austria-Hungary	5,861,000	1,132,000	4,729,000	The Cape Colony	339,000	148,000	191,000
Canada	3,745,000	1,100,000	2,645,000	British India.....	481,000	305,000	176,000
Victoria	532,000	†	532,000				

† Less than 1,000 tons.

With regard to the chief British colonies, the following statement shows what has been the consumption of coal per head of the population in each colony, the amounts being in every case stated in tons of 2,240 lb. :—

Canada.	New South Wales.	New Zealand.	South Australia.	Queensland.	Western Australia.	Victoria.	Tasmania.	Natal.	Cape Colony.
Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
1·43	1·33	1·30	1·07	1·01	0·80	0·68	0·51	0·37*	0·19

* In 1898.

It will be observed that the two largest coal producing colonies, namely, Canada and New South Wales, show, as might be expected, the largest *per capita* consumption of coal.

DANGERS OF ELECTRICITY UNDERGROUND.

As there are a few electrical plants installed underground in this State for the purpose of pumping water, and as it is likely that in future there will be further extensions in the adoption of this power, I consider it advisable to take the present opportunity of pointing out to colliery managers some dangers connected with the use of electricity underground. With this object, I append particulars of an accident described in the Report of the Inspector for the Midland District of England for 1900. I would also refer colliery managers to an article on the dangers of electricity, to be found on p. 136 of Vol. 21 of the "Transactions of the Federated Institute of Mining Engineers," some accidents from which are as follows:—

Extract from Report of Mr. Stokes, Inspector for Midland District.

ELECTROCUTION.

Fatal.

Accident No. 696.—The deceased was an official (deputy) of the mine, and was killed by receiving an electric shock from an electric motor in use in the mine.

The dynamo generating the electricity is fixed on the surface, and from this dynamo two insulated cables are carried down the shaft and into the mine, a distance of over a mile from the shaft bottom, where a junction of cables occurs, one branch leading to an electric pump, and one leading to a small motor of $2\frac{1}{2}$ horse-power, about 300 yards beyond the junction. This motor was used for driving a small ventilating fan. Deceased, with the assistant electrician and a youth, were engaged at the motor and fan getting ready for starting, when the deceased leaned over the motor to screw up a bolt; he brought his bare arm in contact with the terminals of the motor, and received the electric current through his body. The assistant electrician was within a few feet of the switchboard, and directly he heard the deceased cry out he rushed to the switch and threw out the connection, cutting off the current. Deceased was placed on the floor and left in charge of a youth, while the assistant ran for help 300 yards away. There was a double pole switch and also a starting switch within 5 feet of the motor, and both men thought the current was cut off at the time of the accident. The starting switch was thrown on, but the double-pole switch does not appear to have been cleanly cut off, with the consequence that the current was passing along the wires. The deceased's right arm bore two round, deeply-burned scars, which corresponded with the two terminals of the motor, and such burns were unmistakable evidence of where and how the current had passed into the body of deceased. His arm was bare, and would be damp, if not actually wet, and he would be standing upon the ground. There was, therefore, little difficulty in ascertaining how the accident occurred, but there are matters connected with the death which require further notice.

The electric current was a continuous current, and the voltage not more than 500 at the dynamo, for there is a cut-out near the dynamo made to act at 500 volts. The length of the cable down the shaft and to the motor in the mine would reduce the voltage to about 450 at the motor, a pressure which has occasionally been received by electricians and others without fatal results. There is a considerable difference between the shock from a polyphase alternating current and a continuous current, the former being far more dangerous than the latter. In this case, the electrician of the colliery had the same current through his body a few weeks before the accident, and was slightly hurt, but suffered no ill effects. The deceased man was of fine physique, and apparently very healthy; but the current traversing his whole system probably produced nerve paralysis, and caused instantaneous stoppage of the heart and lungs, and death by asphyxia followed.

It is to be regretted that the assistant electrician with deceased left the prostrate man stretched out on the floor and went to fetch assistance, some 300 yards away. No effort, whatever, appears to have been taken to restore animation to the body of the deceased.

In cases of shock and insensibility from receiving an electric current through the body, it should be understood that the person may not necessarily be dead, even though his breathing be suspended, but death will soon take place unless the action of the heart and lungs is revived without delay, in a similar manner to a person apparently drowned, whose breathing is suspended, and who would die if means were not adopted at once to restore animation. The remedy in both cases is the same, viz., artificial respiration, and as electricity is now being used so largely in mines, and shocks are occasionally received, I think it necessary to caution officials and others that in case of being called to a person who is apparently dead through receiving an electric shock, they should at once apply the instructions given for artificial respiration, and this should be made widely known to all ambulance men and classes, for while such persons have been taught the system in cases of drowning, I do not find it taught with respect to resuscitation after an electric shock.

If a man has an electric current pass through his body it generates heat, and causes serious muscular contraction, or creates an influence of the nervous system which controls the heart and lungs, and which remain contracted until the current is taken off, or the charge may strain or rupture some of the organs of the body, which appear to be specially vulnerable



THE PIT TOP, SOUTH BULLI COLLIERY.



WEIGHING CABIN, SOUTH BULLI COLLIERY.

vulnerable to electric currents, or it may rupture a membrane of the body. An electric current continued through the body prevents the heart from acting, and if the current is sufficiently strong the heart stops, and the man is apparently dead, the actual contact with the body being shown by burning of the flesh.

There may be a further word of caution inserted here, viz., the mode of releasing a man from such a position, whether the switch should be used to cut off the current or an attempt be made to drag the man away. In the former case, electricians tell us that if the switch is used, although only 450 volts may be passing, yet at the moment the contact is broken a man in touch with the machine may receive over 1,000 volts, owing to induced current in the motor, and, therefore, such a method might be fatal to the person being released. On the other hand, if the man's clothes are taken hold of, he could be safely pulled away without injury to his rescuer and without the least danger to himself.

The directions for restoring the apparently drowned appear to be, with slight modifications, applicable to those suffering from an electric shock. After the injured man is released from the current he should at once be laid upon his back, and artificial respiration commenced without delay.

After removing all tight clothing from the neck and chest, especially releasing the braces, the instructions for the restoration of breathing must be followed and energetically persevered in for at least an hour, or until a medical man arrives to take charge of the case. There is no necessity to remove the man from the mine or on the surface. The injured man should be at once placed in a dry place, and artificial respiration commenced.

Extracts from Vol. 21, Transactions of Federated Institute of Mining Engineers.

ACCIDENTS FROM SHOCK.

Accident A.—The deceased, 36 years of age, was of heavy build, and was employed as deputy. A shunt-wound motor of 2½ horse-power was driving (by belt) a small fan; the voltage at the dynamo was 500.

From a report of the Coroner's inquiry, it appeared that: The motor and fan had been working during the night without attention, other than occasional visits from the deceased, who was deputy in charge of the district. Early in the morning deceased went to the assistant electrician and informed him that there were some pins loose on the motor. Together they proceeded to the motor, passing on their way (at a point about 900 feet from the motor) a main switch which controlled the motor-circuit. Some conversation took place as to whether this switch should be left on or off; eventually the deceased decided to put it on, and thus save the trouble of going back to it when ready to start; to this the assistant electrician objected, but considering the deceased as the senior in authority it was left on. At the motor there were two switches—one a double-pole main switch, and the other the resistance switch, with automatic release. The assistant electrician asked deceased whether both these switches were off, and deceased replied that they were. The two men then examined the motor, and found some pins loose. Deceased volunteered to tighten these whilst the assistant electrician went to oil the fan, close by. Deceased went to the back of the motor, between it and the switch (which was 6 feet from the motor and 4½ feet from the ground), and, leaning over the top of the motor, commenced to tighten up the pins, when the assistant electrician heard deceased say, "Oh, pull me off!" The assistant electrician, thinking that deceased must be receiving a shock, and being afraid of one himself, instead of pulling deceased off, went to the main switch (which he found was just making contact) and switched it off; then, going to the deceased, he lifted him off, apparently dead. The assistant electrician, in reply to the Coroner, said he thought it possible that the deceased might have put the switch on with his body in working behind the motor.

A doctor stated that he examined the body when it was brought out of the pit. "There were two burns on the right arm, each about the size of a sixpence, which had apparently been received from the positive and negative terminals. This would complete a circuit, which would traverse the whole system, and produce nerve paralysis, resulting in the instantaneous stoppage of the heart and lungs, and death from asphyxia. The deceased was a man of fine physique, and very healthy. If artificial respiration had been immediately started, with the application of an electric current over the heart, life might probably have been saved."

The Coroner, in summing up, stated that "It was remarkable that a current of 450 volts should kill the deceased; there must have been some idiosyncrasy in his constitution. It was clearly the neglect to see the switches cut off, either at the stall-head or at the motor, that had brought about the unfortunate accident. If anybody had been there who well understood the Marshall-Hall method of artificial respiration, the deceased might have been saved, even though a few minutes had elapsed. He thought that the jury would say that the affair was a pure accident, and that the only man to blame was the deceased himself, who was the deputy in charge, and should have seen that the switches were properly turned off."

The verdict of the jury was "Accidental death."

From the evidence it would appear that the man was killed by a shock of 500 volts in a space of time of about ten seconds. Further investigations made by the author are embodied in the following recapitulation, which, at the risk of being tedious, is necessary for clearness:—

The deceased, in leaning over the top of the motor (which was stationary at the time) to tighten some pins, accidentally put his arm in contact with the terminals on the top of the motor. The starting switch and main switch were both said to be off at the time. That this was not so is evident by deceased receiving a shock; and the evidence of the assistant electrician shows that he afterwards found the double-pole main switch partially on and the starting switch off.

Accident B.—Figure 3 is very nearly self-explanatory. The accident occurred at a gate-end, up to which the cables were run for a coal-cutting machine (which was not at work at the time). The trailing cables were coiled up, and there was no current in these cables, as the main switch in the switch-box was off. A volt-meter was connected on the dynamo side of the switch-box. The deceased (a powerful young man, and 25 years old) ran the iron tub; he was "hurrying" off the rails, at the rail-end, into the volt-meter, cutting through the insulation of the connecting wires and making a connection through the tub, himself and earth. He was found about twenty minutes afterwards, apparently dead, with the current still passing through him, his hands resting on the tub and himself full stretch, face downwards. It is somewhat unaccountable that when first receiving the shock he should have lost the power of disconnecting himself; probably, however, this was due to the position. No attempt was made to restore respiration. The voltage was 500.

Accident D.—A pony was killed by a pressure of 400 volts, in a damp-gate end; vulcanised rubber insulated (single) cables (insulation a good deal worn) were lying on the ground; the pony, in being turned round, trod on the cable, and fell down dead. The boy holding the iron shafts did not feel any shock.

There is no evidence in this case as to how the shock was received—that is, whether contact was made through 2 feet and the two cables or only 1 foot and one cable; in all probability the former. It is natural that the boy should not feel a shock, as the harness would be an insulator.

Accident E.—A pony was killed at a gate-end by a current of 400 volts. Two single vulcanised cables were securely cleated to the sides of the road. A boy drove the pony to the gate-end, with a journey of empty tubs, instead of stopping at the turnout. This necessitated turning the pony and driving him between the side carrying the cables and the empty tubs. In doing this the hames caught the cable; the pony, struggling to get free, cut through the insulation, received a shock, and fell down, carrying the cables to the ground. The hames were connected to the girth-band by a chain, the former also being a chain. Endeavours were made to free the pony, but the men received shocks, which prevented them from doing so until a messenger was sent to bank to stop the generator, notwithstanding the fact that there was a double-pole switch within 300 feet of the place where the accident occurred. The pony received the shock for about fifteen minutes; it was just alive when the current was shut off, and died shortly afterwards. The only noticeable feature after the accident was that the pony was scorched round the girth.

In the United States of America deaths from electricity are more frequent than in this country, on account of the use of bare trolley-wires for the locomotives. In dealing with these cases, continuous currents and a maximum of 500 volts have been chosen. Alternating currents, whether single or multiphase, are at least 50 per cent. more dangerous, both as regards danger to life and fire, and with the exception that some types of motors have no collecting-rings, need not be separately considered.

ACCIDENTS FROM FIRE.

Accidents from fire are caused by (a) short circuits, that is, a positive conductor coming into contact with a negative conductor, causing a heavy rush of current; and (b) bad contacts, causing arcing of the current.

Accident F.—A small motor was driving a pump, the main switch and the resistance switch were combined on a slate-base (Fig. 4). The pressure was 500 volts. The lad in the pump-house saw an arc stand on the switch at the contact of the movable arm with the metal block; not liking to go near the arc, he left the pump to go to the pit bottom to switch off, and by the time he returned the place was alight. After the fire was extinguished, the switch was found with
about

about 3 inches of brass contact-bar, $\frac{3}{4}$ inch by $\frac{1}{2}$ inch (which was fastened to the slate-base), melted right away, and the slate in the immediate neighbourhood burnt away nearly $\frac{1}{4}$ inch deep. The molten metal had fallen on the oily floor, probably oily waste, and as likely as not into a tin jack of oil which was standing below the switch. This fire was due to bad contacts.

The breakage of a cable carrying a current would cause a flash, but experience shows that a fractured cable, if of suitable quality, is unknown, and with almost any quality if erected properly a fracture cannot occur, even with a heavy fall of roof.

A short circuit is rendered harmless by circuit-breakers—that is, automatic switches which break the circuit when the current exceeds a predetermined amount; or safety-fuses, which melt and break the circuit when an excessive current passes. For instantaneous action, the former are preferable.

BOILERS.

In March, 1900, a Select Committee was appointed by the Imperial House of Commons to “consider and report on the advisability of legislation to ensure the systematic and regular Inspection and Certification of Boilers, with the object of diminishing the risk to life and property arising from Boiler Explosions.”

After an exhaustive examination of experts on the matter, the Committee reported as follows:—

Your Committee report that the evidence given before them goes to show that some explosions occur in boilers from mistakes or incapacity on the part of the attendant, undue pressure, loss of water, and other causes, and that inspection, however efficient, could not prevent such explosions.

Your Committee report that explosions undoubtedly occur more frequently in boilers which are uninspected than in those which are inspected by a competent person, and that every one of the witnesses, with the exception of two who expressed no opinion on the point, advocated the desirability of a systematic and periodical inspection of boilers used for generating steam, and recommended legislation making such inspection compulsory.

Your Committee consider that inspection by a competent person would tend to diminish the risk of explosion, but at the same time they hold that it is of the greatest importance to maintain the responsibility of the boiler user for the condition and safety of the boiler which he works.

Your Committee point out that there are three ways of bringing about more frequent inspection by competent persons:—

- (1.) By the appointment of Inspectors under a Government Department. Your Committee do not recommend this, as they consider:—
 - (a.) That the responsibility of selecting a competent person should fall upon the owner or user of the boiler,
 - (b.) That the owner would shelter himself behind the Inspector of a Government Department.
 - (c.) That the Inspectors under a Government Department would work upon inelastic lines, and that this would hamper the development of boiler improvement.
- (2.) By extending the powers of the Court set up under the Boiler Explosion Acts, 1882-1890, giving that Court power to inflict heavy penalties on the owner or user of a boiler in the event of an explosion, if it be shown:—
 - (a) To the satisfaction of the Court that such owner or user failed to have his boiler inspected by a competent person at a reasonable period prior to the explosion; conditions of working-quality of feed-water, and custom of the locality to be considered by the Court, when determining what a reasonable period is.
 - (b) That the boiler has been worked since the last inspection at a pressure exceeding that for which the boiler has been certified, or that there has been wilful and culpable negligence in carrying out any recommendations made at the last inspection; also giving the Court power to inflict like penalties on the Inspector, if it be shown to the satisfaction of the Court that the inspection was carelessly or insufficiently carried out.

Your Committee think that this extension of powers would tend to increased boiler inspection, because the larger responsibilities of the owner or user would be brought home to him by public reports, and by the various boiler Inspectors or boiler inspection and Insurance Companies. Your Committee think that in these cases an appeal should be allowed, but they find great difficulty in suggesting the Court to which such an appeal should be made.

3. Your Committee further consider that an extension of the Factory Acts, empowering an Inspector to call upon the owner or user of a boiler to produce a certificate or entry showing that he has had his boiler inspected by a competent person within a year, and providing that in cases where the Factory Acts do not apply this authority should be vested in the police, would make the inspection of boilers practically universal.

Your Committee do not consider that boilers working in or about mines should be subject to legislation, as these boilers fall under the Mines Acts, and are already under inspection.

Your Committee consider that no legislation is necessary in the case of locomotives on railways.

Your Committee understand that hotels now come under the category of private houses, and that consequently if any explosion occur with a hotel boiler, no inquiry is held under the Boiler Explosions Acts, 1882-1890, and they recommend that these Acts should be so amended as to include hotels and flats.

Your Committee have taken no special evidence in connection with boilers in ships, nor do they make any recommendation under this head, nor in respect to keirs, stills, or steam pipes, &c.

At the same time the evidence shows that keirs and stills are liable to explosion, and when they explode may cause both damage to property and loss of life.

Boilers, as defined in this Report, are the only things upon which they report.

Your Committee consider that the boiler-making industry has made great strides in recent years, that boilers are, as a whole, better designed, better made, and better managed and understood than they were only a few years ago; and that legislation giving any Government Department control over the inspection of boilers would be a grave mistake.

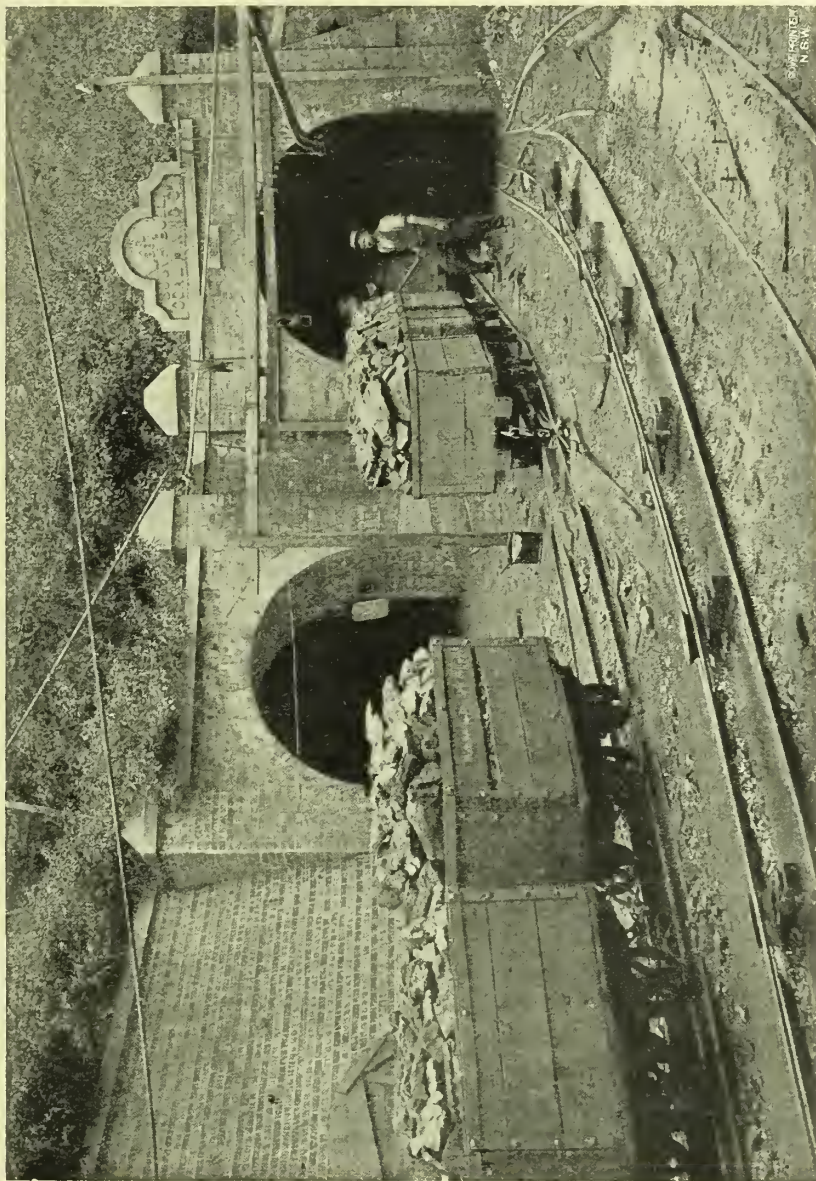
Your Committee consider that State certification or registration, unless accompanied by State Control, would not be of any practical value.

In this State there has fortunately been a great immunity from boiler explosions at the collieries, and in this respect great credit is due to the mechanical engineers, under whose direct control they come.

As it is not usual to have inspectors from insurance companies to examine and report on colliery boilers here, as is the case in Great Britain, it would be advisable on the part of the colliery managers and engineers to have periodical examinations of boilers made of a thorough nature by a competent person, who should make a report to be kept at the Colliery Office. It is also advisable to keep records of all repairs to boilers, in fact particulars sufficient to form a full account of the history of a boiler.

UNDERGROUND FIRES.

Several underground fires have occurred during the year, one of which unfortunately resulted fatally. This is No. 5 in the fatal accident list. It occurred in a prospecting drive, which was driven about 100 yards into the hillside in a coal seam near to Curlewis. In addition to this, there have been several other fires, one of which (at the West Wallsend Colliery) caused some loss of work and expense in dealing with it. At most of the collieries where naked lights are in use, colliery managers have wisely adopted the precaution of sending an official round the workings with a locked safety lamp, in order to see that no smouldering fires exist, and in some cases, with commendable prudence, they cause the official to enter a report of his inspection. This work, to be of value, should be conscientiously and thoroughly done by the official, and he should be allowed a reasonable time for its performance.



MOUTH OF TUNNEL, SOUTH BULLI COLLIERY.

GRETA COLLIERY FIRE.

After being sealed down from 9th December, 1900, with a view to extinguish the fire which had been discovered on the night of 5th December, and referred to in last year's report, this colliery was re-opened in April of last year. The seat of fire was reached, and after a considerable quantity of fallen and heated material had been sent out of the mine, the fire revived, and although an ample supply of water was available, it was impossible to cope with it, and after being open for about ten days, the pits were again sealed down.

On 6th January last it was again re-opened, and after considerable difficulty in dealing with heated material, the fire of 5th December, 1900, was successfully dealt with, and the bodies of Edwin Buck and Walter Fuller recovered. An inquest was held, and the following verdict was the result:—"That the said Edwin Buck and Walter Fuller, in the Greta pit, Greta, in the district of Maitland, in the said State, on the fifth day of December, 1900, died through being suffocated in a fire which took place in No. 2 flat in the Greta pit, situate as aforesaid on the same day; but how, or by what means, the fire originated, whether by accident or otherwise, the evidence adduced does not enable us to say."

Unfortunately a gob fire broke out in the old workings in another part of the pit, and about 340 yards distant from the fire of 5th December, 1900, and as it got into active flame and of large dimensions before water could be applied, the pits had to be re-sealed, and this was done on 1st March. In consequence of the wide openings and thin pillars in the workings of this colliery, it is hardly possible to seal a district off below.

As the fire of 5th December, 1900, is the subject of an inquiry under Section 23 of the Coal Mines Regulation Act by Mr. Commissioner C. G. Wade, who will no doubt resume it after the colliery is re-opened, and the other three bodies recovered, I do not propose at present to make any further remarks in regard to it.

USE OF PETROLEUM OIL ENGINES AND PETROLEUM UNDERGROUND.

Petroleum oil engines are occasionally used underground for the purpose of pumping small quantities of water, which may be met with at considerable distances from any available source of power which might be required to pump it out. In such cases, they may be found economical and useful, and if reasonable precautions are taken, no danger to life or property should result.

In order, however, to illustrate some of the dangers in connection with their use, particulars are given of two accidents which happened in English collieries some years ago, in one of which special rules framed to avoid accidents in connection with their use are quoted:—

(1) No. 9 upon the list was the most important accident of the whole year, and it arose from a novel cause, at any rate, as occurring in a mine. It happened on the 29th March in the Walsall Wood Colliery, and in an underground engine recess by the side of one of the main hauling roads. In this recess had been placed a Priestman's petroleum engine made by Messrs. Priestman Brothers, Limited, of Hull. The motive power of this kind of engine is exploding petroleum vapour, and their compactness, readiness of application to difficult positions, and the absence of necessity for a boiler to supply the motive power, make them a tempting mechanical appliance for mining engineers who have to apply hauling or pumping power long distances inbye from the shaft.

Such a necessity had arisen in this colliery, and the general-manager had placed a petroleum engine by the side of a main road at a distance of 500 yards from the shaft. It had not been handed over by the makers to the Colliery Company, and at the time of the accident it was being tested by their workmen. It was considered by these men necessary to empty the oil tank of the petroleum which it contained, and this, after all the oil which could do so had flowed out of the tank, could more readily be done if the tank had some compressed air in it. A youth was sent under the engine with a bucket to catch the oil as it flowed out of the discharge plug-hole. Another, the deceased, was to loosen the plug and was told by the man in charge (so he says, but the youth did not hear him) not to bring the lighted lamps near to the tank as the oil rushed out. Finding the plug did not come out easily, he appears to have reached for a light to see it better, just as the plug flew out, followed by the oil blown out by the compressed air in the form of spray. This instantly caught fire at the lamp, the three were burnt, and one fatally. The woodwork about the engine caught fire and produced with the burning oil such a dense smoke that it threatened suffocation to the men in the workings, who, however, were removed through the active exertions of the overman before the smoke reached them.

The public inquiry which followed before Mr. Coroner Stanley, of Walsall, resulted in a verdict of accidental death, but the jury expressed an opinion that in future better precautions should be taken to guard the oil from flame.

This fatality seemed to me to emphasise a new danger to the workers in coal mines, and I felt it desirable that the propriety of their use therein should be thoroughly investigated, and that, if considered dangerous, their further use should be prohibited or surrounded with such stringent regulations that the risk might be reduced to a minimum. With this view I laid the matter fully before you, and I received your directions to serve the following notice upon the Walsall Wood Colliery Co., Limited:—"Whereas, at the above-mentioned mine (the Walsall Wood Colliery), I find the following matter which is not provided against by any express provision of the above Act (Coal Mines Regulation Act, 1887, s. 42) or by any special rule established thereunder, namely, that a petroleum engine is in use in your mine below ground; and, whereas, I am opinion that the said matter is dangerous, so as to threaten or tend to the bodily injury of the workpeople employed below ground in the above-named mine, now I hereby give you notice forthwith to remedy the said matter.—W. B. SCOTT, H.M. Inspector of Mines, 13th May, 1890."

On the 21st May the Walsall Wood Colliery Company replied "that they objected to remedy the matter complained of in the said notice, on the ground that we consider that the said petroleum engine is not dangerous." The matter thus went to arbitration. I, as one of the parties to the arbitration (on behalf of the Secretary of State), appointed Mr. John Williamson, the general manager of the Cannock and Rugeley Collieries, as my arbitrator, and the other side appointed Mr. George Lewis, mining engineer of Derby, as their arbitrator; Mr. Alfred Young, Recorder of Gloucester, was appointed umpire. The necessary views, inspections, and experiments were made, both at the colliery and at the maker's works at Hull, the Holderness Foundry of Messrs. Priestman Brothers, Limited. I had the valuable assistance of my colleague, Mr. Stokes, of Derby, and the special expert aid, by your direction, of Mr. Boverton Redwood, a high authority upon petroleum and its uses. The other side brought engineers of repute from Durham, Cleveland, and South Wales, who had lately begun to use these engines in their own mines, but in only one case had any regulations for their use been proposed in the form of special rules.

The arbitrators, after a two days' hearing of the facts, and of the expert evidence, and without recourse to the umpire, made their award as follows:—"We award and adjudge that the use of the petroleum engine in the said mine is not dangerous so as to threaten or tend to the bodily injury of the workpeople employed below ground in the said Walsall Wood Mine."

Moreover, each party was directed to pay its own costs, and to pay one-half of the fees of arbitrators, umpire, and award.

The arbitrators and the umpire then, in the form of a letter to yourself, made the following statement:—"Having all of us thoroughly investigated the matter, we desire to represent to you our unanimous opinion, that the following regulations ought to be made and adopted, whenever petroleum engines are used in any mine to which the Act applies."

Now in considering these recommendations of the arbitrators and the umpire (which, however, I do not give here), I judged that a more complete and satisfactory code of rules might be drawn up, if some of the rules for the regulation of these

these engines, which had been provisionally agreed upon between Mr. Thomas Bell, my colleague, of Durham, and one of the owners of a mine in the Durham district, where such an engine was at work underground, were grafted upon those recommendations.

I therefore submitted to you a code of "Petroleum Engine" special rules, which after discussion with the general manager of the Walsall Wood Colliery, were, with some modifications, adopted and are now, at that mine, of the force of law. They are appended below:—

Petroleum Engine.—The engine room shall have a travelling road, at least 5 feet wide and 5 feet high, communicating direct with the return air-course, through which the exhaust from the engine shall be taken, and by which the air current which ventilates the engine room shall pass to the main return air-course.

The petroleum shall be conveyed into the mine in sealed tanks sufficiently strong to resist a fall of roof or possible damage from any other cause.

The petroleum shall only be taken into the mine in quantity sufficient for one day's working of the engine.

When the tank of the engine is being filled with petroleum from the sealed tanks the petroleum shall not be allowed to come into contact with the atmosphere.

The tank of the engine shall be taken out of the mine whenever it is necessary to clean it.

"The storage or sealed tanks, with their daily supply mentioned in Special Rules 53 and 54, shall be kept in a securely closed chamber not less than twenty yards on the outbye side of the engine room.

"Any waste of petroleum shall be at once covered or taken up with sand.

"For a distance of twenty yards on every side of the engine room the roofs, floors, and sides shall be kept free from dust, and the roofs and sides kept thoroughly whitewashed.

"All wood and inflammable material shall be removed from the vicinity of the engine room.

"Only safety-lamps should be used within the doors of the engine bed-plates, except when lighting up.

"Such petroleum only shall be used for the purposes of this engine as will not give off an inflammable vapour below 100 degrees of temperature on the Fahrenheit scale (Abel test).

"The waste oil from the engine and the refuse cotton-waste shall not be allowed to accumulate, but must be sent out of the mine daily."

2. On the 21st August a bye-workman named Metcalf was suffocated in the Crigglestone Colliery under the following circumstances:—The colliery was not at work on that day, but a few men were in, doing repairs and other necessary work. Metcalf was engaged in building a pack at a gate end in the dip district, and he went to this work about 6 a.m. About 2 o'clock p.m. he was found lying on his face, quite dead, by a man named Farrar. There was nothing in the shape of fallen roof or coal upon him, and his lamp was burning. Ephraim Ramsden, the under-manager, was in the pit that day, and he ought to have visited each of the men who were repairing, during the morning, Metcalf amongst them. This he had failed to do. Farrar, who had brought Ramsden and others to help, remarked that he had felt very poorly in this place the day before, and then began to laugh and throw his arms about. The other men at the same time felt strangely ill, and went out, leaving Farrar. When they returned with additional help they found Farrar insensible, and with difficulty brought him round.

The dip district in question was ventilated by a separate current of air, having its own independent upcast shaft, ventilation being obtained by means of exhaust steam from a ram pump and two hauling engines.

On the day in question these engines were not at work, and the pump was off from 7.30 until 2 o'clock for repair. This was known to the under-manager, who also, of course, knew that he had some men working in the dip district.

Not far from where Metcalf was working, a small pumping engine exhausted into a return air-way. This was a paraffin oil engine. The air-way joined another return from the dip district, and close to Metcalf; and it is very probable that, in consequence of the ventilation being practically at a standstill, owing to the stoppage of the engines I have alluded to, the fumes from the paraffin engine may have backed down on to the man and suffocated him.

It was suggested that there had been an outburst caused by weighting of "stone" or "laughing" gas, which had been the cause of the poor man's death; but I decline to the former theory, and the jury, after a most painstaking inquiry, returned a verdict of "accidentally suffocated, probably from the fumes of paraffin."

For so gross a breach of the Act and neglect of duty, you were pleased to direct proceedings to be taken against Ramsden, the under-manager, who was accordingly brought before the magistrates at Wakefield, convicted and fined.

The following analyses, taken from a letter by Mr. A. L. Stephenson, in "Engineering," of 26th July, 1889, shows the dangerous character of some of the exhaust gases from a petroleum engine:—

	104 Revolutions.		153 Revolutions.	
	1.	2.	3.	4.
N	78.34	75.13	83.49	81.01
CO ₂	3.75	5.41	8.40	9.60
O	1.25	3.04	4.40	2.88
H	7.50	8.66	2.91	2.07
CO	9.16	7.76	0.80	1.44
	100.00	100.00	100.00	100.00

It may be noted that the slower speed gives off a much higher percentage of that very poisonous gas-carbon monoxide.

In those cases where colliery managers adopt these engines in the State, they should take the precautions already found to be necessary in England.

AMBULANCE.

The proceedings for the year include the granting of the silver medallion of the corps to the whole of the members of the advanced class at Minmi, and of certificates to the Balgownie class.

It may be mentioned that the handbooks, triangular bandages, and blankets required by each class are supplied free of cost. The corps also provides an examiner, and where it is necessary to hire a room for the use of the class, bears half the cost thereby incurred. Certificates are awarded to candidates who are successful in obtaining the prescribed number of marks in the primary examination, and silver medallions to those who, having held the certificate for twelve months, pass the secondary or advanced examination. It is regrettable to find that these liberal conditions, attached to the acquisition of knowledge in itself important, evoke so little enthusiasm amongst the general mining community.

During the year several tests were made, both in the laboratory of the Department and in the foul atmosphere of a colliery, of the suitability of the "Fleuss breathing apparatus" for exploring in the case of explosion or other accident in a noxious atmosphere, but I regret to say that so far as could be judged, the apparatus

apparatus is, for this purpose, a complete failure. The following letter from Messrs. D. A. W. Robertson and Joshua Jeffries, the General Manager and Manager respectively of the Metropolitan Colliery, Helensburgh, where the apparatus was tried, will be read with interest :—

The Metropolitan Coal Company of Sydney, Limited.

Metropolitan Colliery, Helensburgh, 30 October, 1901.

A. A. Atkinson, Esq., Chief Inspector of Coal Mines, Sydney.

Dear Sir,

Fleuss Safety-breathing Apparatus.—As a result of experiments made at the Metropolitan Colliery with this apparatus, we are reluctantly compelled to state that in our opinion it falls far short of realising the expectations of the inventor or the desire of mining men, in point of fact is not as at present constructed a desirable appliance for general rescue work or exploration.

Its chief defects are—

1. Its weight and the complicated and delicate nature of its parts.
2. The construction of the mask, which cannot be safely worn by bearded or thin-featured men.
3. The extremely short period during which the oxygen supply can be relied upon.
4. The liability to injury of the breathing tubes and oxygen valve in passing over obstructions.
5. The practical impossibility of exploring, especially in roads obstructed by falls, &c., owing to the moisture from the breath gathering on the goggles seriously interfering with the vision.

At one of the trials referred to in an atmosphere highly charged with CO_2 , CO , and CH_4 , which would have been speedily fatal to life, the first explorer walked for some 10 minutes without difficulty, although, wearing a beard, he was conscious of inhaling to some extent the noxious gases referred to. The second to experiment experienced no difficulty on entering, but on returning had a feeling of oppression which was accounted for by the oxygen supply giving way when the third explorer was about to make a trial, although on opening the valve immediately preceding, the pressure seemed to indicate an ample supply. While accepting with reserve the estimated duration of oxygen supply being sufficient for four hours, it was apparently running no risk to enter an irrespirable atmosphere when scarcely twenty minutes had elapsed, and it was a fortunate circumstance that the third experimenter had not left the fresh air when the cylinder gave out.

That the period during which the oxygen can be depended on does not exceed twenty minutes has been practically demonstrated on several occasions. Manifestly, therefore, the maximum time being twenty minutes, the safe limit in a noxious atmosphere could not be assumed at more than ten minutes, and under these circumstances the useful scope of this apparatus is very limited.

The early exhaustion of the oxygen seemed to us due to waste by escape through the mask and the ineffective india-rubber joint on the bag, and in all probability the main features of the invention, viz., the absorption of the carbonic acid exhaled by caustic soda is more or less inoperative. In our opinion it should never be used at a greater distance from the base than the explorer could safely return to if the oxygen supply failed or the apparatus became ineffective from any other cause. The apparatus might be useful under special circumstances within such a limited radius for observation, although the defects of vision referred to would seriously discount its value even for this purpose. For rescue work it is difficult to see how it could be of service, as weighted with a cumbersome impedimenta, and with one hand engaged with a lamp, and the other necessarily to be at liberty for manipulating the oxygen valve, the rescuer would find it difficult to render assistance to the injured.

It has been proved, and is a somewhat curious circumstance, that the consumption of oxygen by different persons varies within wide limits, and this itself is a source of danger, inasmuch as one explorer requiring the maximum, relying upon the previous experience of others using a minimum, might conceivably find himself in a position of danger, with the oxygen exhausted well within the working period of his predecessors.

Although not affecting the principle of the Fleuss apparatus, we desire to emphasise the danger of charging a cylinder *unprovided* with a safety valve to 400 lb. pressure from one charged to 3,000 lb., even although a pressure gauge be attached.

In conclusion, we do not altogether condemn this alleged safety appliance, but, in our opinion, it should be a last resort taken by experienced persons under special circumstances and within a limited radius.

D. A. W. ROBERTSON.
J. JEFFRIES.

EXAMINATIONS FOR CERTIFICATES OF COMPETENCY UNDER THE COAL MINES REGULATION ACT, 1896

The constitution of the Board for appointing Examiners is as follows :—

Jesse Gregson, Esq., J.P. (Chairman), Australian Agricultural Co., Newcastle	} Mine Owners.
W. Sandford, Esq., J.P., Eskbank Ironworks, Lithgow	
Thos. Saywell, Esq., J.P., 6 Park-street, Sydney	
D. A. W. Robertson, Esq., J.P., Metropolitan Colliery, Helensburgh	} Mining Engineers.
Richard Thomas, Esq., J.P., Brown's and Duckenfield Collieries, Minmi	
L. B. Blackwell, Esq., J.P., Sydney	
Adam Cook, Esq., J.P., Wallsend	} Miners.
J. G. Hutton, Esq., Thirroul	
David Leake, Esq., Lithgow (Resigned 12th March, and succeeded by John Thirlwell, Esq., Lithgow, 21st June)	
A. A. Atkinson, Esq. (Vice-Chairman), Chief Inspector of Coal Mines.	
Secretary to the Board—H. D. Wood, Esq., B.A., LL.B., Crown Law Offices, Sydney.	

The Examiners appointed by the Board were Messrs William Humble, F.G.S., Thomas Parton, J.P., and J. H. Ronaldson. These gentlemen acted in that capacity at the examination held at Newcastle in July. In consequence of Mr. Ronaldson having left the State in the beginning of November, Mr. H. Osborne McCabe, J.P., was appointed by the Board to fill his place.

Examinations were held in Sydney on the 16th, 17th, and 18th January, and at Newcastle on the 17th, 18th, and 19th July, 1901, with the following results :—

	First-class Certificates.		Second-class Certificates.	
	No. of Candidates.	No. of Passes.	No. of Candidates.	No. of Passes.
Sydney	6	1	6	2
Newcastle.....	6	2	16	6
	12	3	22	8

By permission of the Board, the questions put at the written examinations in 1901, are appended:—

EXAMINATION FOR FIRST-CLASS CERTIFICATE OF COMPETENCY.
Technical College, Sydney, 16th January, 1901. 9.30 a.m. to 12.30 p.m.

Marks.

Arithmetic.

- 6 1. A borehole has to be put down to a depth of 90 fathoms, at a cost of 7s. 6d. per fathom for the first 5 fathoms, and then increasing at the rate of 7s. 6d. per fathom for every succeeding 5 fathoms: What will be the cost of the boring?
7 2. The pump column in a shaft is 620 feet long and 8 inches internal diameter; it is full of water, and you are required to find—(a) weight of water in tons, (b) pressure per square inch on the base of the column.

Geology.

- 6 1. Show, by section, the relative positions of the known coal seams in the different coal-fields of New South Wales.
5 2. Name the agents which operate in the disintegration of strata.

Surveying.

- 6 1. Describe the instruments used in surveying and levelling, and the conditions under which they are severally used.
6 2. Describe fully what steps you would take in beginning to make a colliery plan to ensure the correct relation between the surface features and the underground workings, and the correct plotting of the underground surveys in subsequent years.
7 3. Plot the following survey:—

No. 1. N. 56° ½ W.	352 links.	No. 5. S. 41° ½ E.	476 links.
No. 2. N. 16° ¼ W.	230 "	No. 6. S. 10° W.	216 "
No. 3. N. 33° E.	225 "	No. 7. S. 81° W.	321 "
No. 4. S. 56° E.	392 "		

Give bearing and distance to "tie" the survey.

Ventilation and Mine Gases.

- 12 1. Enumerate and describe the main laws which govern the friction of air currents in mines.
8 2. What precautions would you take before firing a shot on a dry and dusty roadway in a moderately fiery mine? Answer fully.
10 3. In a mine which is being worked with naked lights, describe fully the conditions which would necessitate the introduction of safety-lamps.
10 4. Show, by sketch, the best position for a regulator where gas is giving off in the working face and in the return at the same time. Give your reasons.
10 5. Ventilate the accompanying plan, showing all doors, stoppings, air-crossings, regulators, &c. The mine yields fire-damp.

EXAMINATION FOR FIRST-CLASS CERTIFICATE OF COMPETENCY.
Technical College, Sydney, 16th January, 1901. 2 p.m. to 5 p.m.

Marks.

Coal Mines Regulation Act, 1896.

1. What does the Act require regarding—
7 (1) Duties of Manager and Under-Manager?
7 (2) Fencing, in case of abandoned mine?
7 (3) Signalling in shafts and on planes?

Winning and Working of Coal and Shale.

- 8 1. Knowing a mine is liable to spontaneous combustion, what permanent precautions would you take to minimise the danger thereof?
10 2. Show how you would lay a walling crib, and how you would build upon it 60 feet of 9-inch brick walling, joining up to a similar section of walling. With what material would you pack the space behind the walling?
12 3. Given a coal property of 500 acres with a seam 6½ feet thick, dipping 1 in 20, at a depth of 1,000 feet, with a hard bottom and yielding roof, what system of working would you adopt? And show by sketch plan how you would lay out the workings.
10 4. What precautions would you adopt in order to guard against underground fires of all kinds?
9 5. In sinking deep shafts, with the liability of gas being met with in the shale-beds and coal-seam, what precautions would you take for safety?

Machinery, Pumps, Boilers, &c.

- 10 1. Find the breaking weight at the centre of a pitch pine beam (co-efficient of rupture, 0.75 tons) 12 inches deep 8 inches broad and 18 feet between the supports; ends fixed, and the load in the centre.
10 2. What is the rule for determining the size of a pair of winding engines, knowing the load and steam pressure?
8 3. Upon what points do the life and durability of a winding rope chiefly depend?
12 4. Show, by plan, the setting of a Lancashire boiler, indicating the course of the heated gases from the fire until they escape at the chimney.

Ventilation and Mine Gases.

- 4 1. Describe fully the various gases met with in coal mines.
7 2. Outbursts of gas from the floor are likely to occur in a seam to be worked by bord and pillar: What steps would you take to guard against accidents from this source?
6 3. How is the existence of a gob fire detected in its first stages? And, knowing it exists, what steps would you immediately take to prevent disaster, and how would you afterwards deal with it?
5 4. Safety-lamps are to be introduced into the face workings of a mine, and you are required to give in detail the arrangements which are necessary to control their use. Shot firing is permitted.
7 5. Ventilate the accompanying plan, showing all doors, stoppings, air-crossings, regulators, &c. The mine yields fire-damp.

EXAMINATION FOR FIRST-CLASS CERTIFICATE OF COMPETENCY.
Technical College, Sydney, 17th January, 1901. 9.30 a.m. to 12.30 p.m.

Marks.

Arithmetic.

- 9 1. In a property of 129 acres the coal is 6 ft. 9 in. thick; 25 per cent. is lost through faults and in working; the miners put out 75 per cent. of large, and 25 per cent. of small, coal: What are the total amounts paid for hewing, when the rate is 2s. 10½d. per ton for large and 1s. 1d. per ton for small; and for royalty, at 1s. per ton for large and 3d. per ton for small?
5 2. There are 3,500 cubic yards of water in a circular shaft, the depth of water being 80 fathoms: What is the diameter of the shaft?
5 3. A shaft has been sunk to a depth of 600 feet; 16 per cent. of this depth cost 35 per cent. per foot more than the remainder, the total cost being £1,504 16s.: Find cost per foot of each portion.

Geology.

- 8 1. What is the approximate composition of bituminous, semi-bituminous, and anthracite coal; and for what purpose is each kind best suited?
6 2. Make sketches, showing false bedding and true bedding in stratified rocks. Explain the cause of the former.
7 3. What is the origin and approximate composition of the New South Wales kerosene shale deposits?

Surveying.

Plan to ventilate

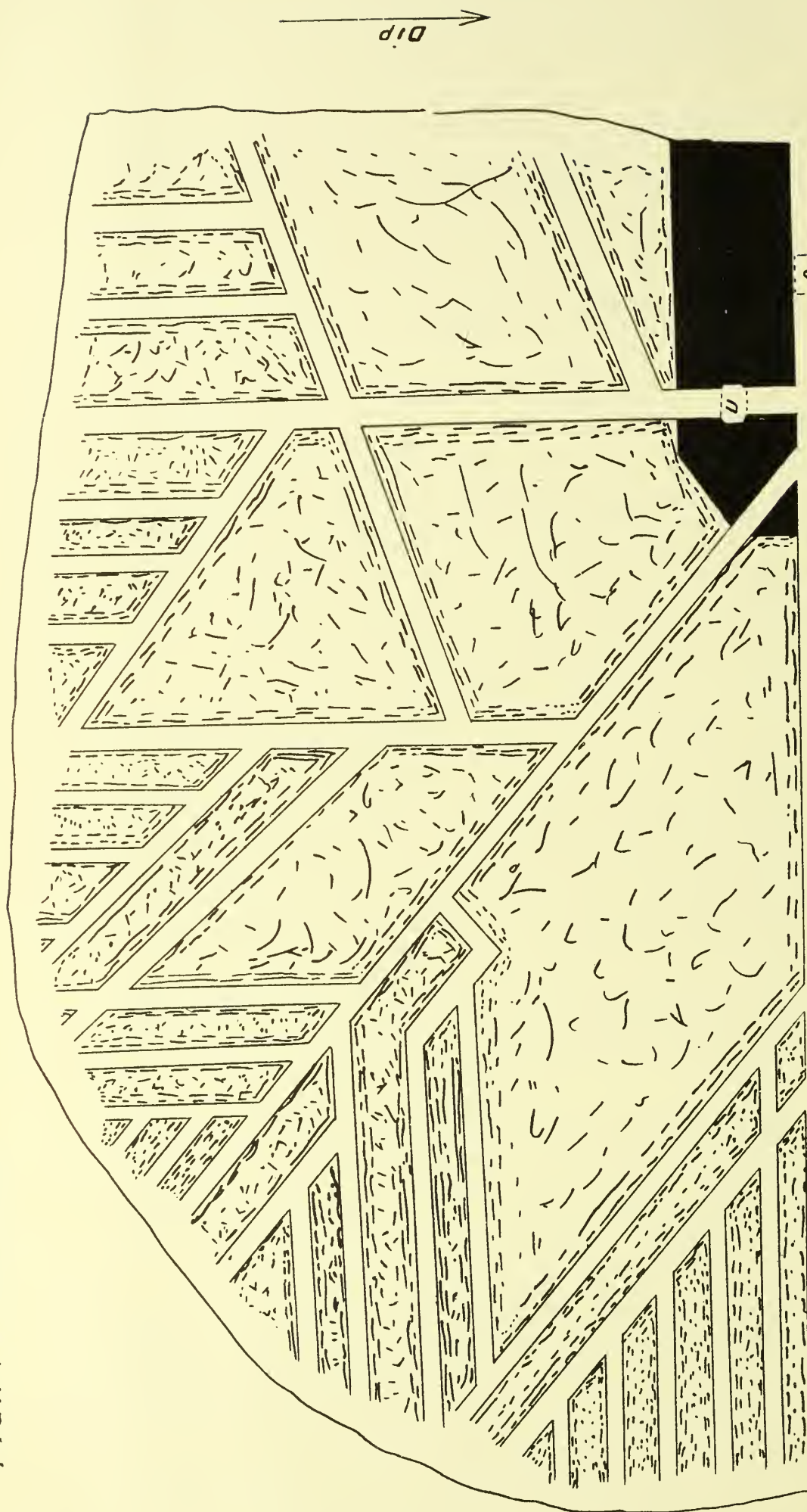


Photo-lithographed by
W. A. Gullick, Government Printer,
Sydney, N.S.W.

Marks.

Surveying.

- 5 1. An underground road, rising 1 in 11, has to be driven N. 45° W. a distance of 22 chains, measured on the slope : How would you provide for its being correctly driven as regards direction and grade? What would be the rise and what would be the westing in that distance?
- 5 2. Find the area, in acres, of a triangular piece of ground, the sides of which are as follows:—112 links, 132 links, 89 links.
- 7 3. Explain how you would set out and drive a curve in a coal seam.

Ventilation and Mine Gases.

- 10 1. Two airways—one 10 feet by 5 feet and 1,800 feet long, and the other 4 feet by 6 feet and 3,000 feet long—circulate together 30,000 cubic feet of air per minute. Assuming the pressure, &c., to remain constant, how much flows along each airway?
- 10 2. Show, by sketches, how you would make and build an air-crossing capable of passing 40,000 cubic feet of air per minute over a roadway 6 feet high and 12 feet wide. Give dimensions.
- 10 3. How much air is required in a mine giving off 2,000 cubic feet of fire-damp per minute, and in which are employed 220 men and boys and 30 horses per shift?

EXAMINATION FOR FIRST-CLASS CERTIFICATE OF COMPETENCY.

Technical College, Sydney, 17th January, 1901. 2 p.m. to 5 p.m.

Coal Mines Regulation Act, 1896.

- Marks. 1. What does the Act require regarding—

- 7 (1) Explosives below ground?
- 5 (2) Withdrawal of workmen in case of danger?
- 7 (3) Inspection of working places before commencing work, and during shifts?

Winning and Working of Coal and Shale.

- 9 1. What method of working would you advise in a seam 600 feet below the surface with the following section:—

	ft.	in.
Sandstone.....		
Hard shale	6	0
Coal	1	5
Band	0	7
Coal	3	1

Moderately hard floor.

- 10 2. What means would you adopt for damping coal-dust in fiery mincs, and what are the conditions under which coal-dust becomes most dangerous?
- 10 3. Show, by sketch, how you would proceed to win out coal on the dip side of a pair of shafts where a considerable yield of water is expected. Also, show how you would deal with the water.
- 12 4. What are the most efficient safety appliances in winding and deep sinking operations? Sketch and describe.
- 10 5. What are the special dangers of working steep mines? Explain how you would guard against them. Make a sketch showing the timbering of a level in a seam dipping 47°.

Machinery, Boiler, Pumps, &c.

- 13 1. Supposing you had to wind 1,000 tons in 8 hours from a depth of 2,800 feet, what sized engines, drums, and ropes would you recommend, with number and size of boilers?
- 8 2. Show, by sketches, the relative positions of a ventilating fan and the upcast shaft when General Rule 3 has been complied with.
- 9 3. Sketch and describe a Cornish valve, and state why it is applied to winding engines above a certain size.
- 10 4. Enumerate the various sources of power available for underground pumping purposes. Describe in detail that which you deem most suitable for—(a) pumps at the shaft bottom, (b) pumps in bye.

EXAMINATION FOR SECOND-CLASS CERTIFICATE OF COMPETENCY.

Technical College, Sydney, 16th January, 1901.—9.30 a.m. to 12.30 p.m.

Coal Mines Regulation Act, 1896.

- Marks. 1. What does the Act require regarding—

- 7 (1) Ventilation of mines?
- 6 (2) Inspection of machinery?
- 6 (3) (a) Securing roofs and sides? (b) Timbering?

EXAMINATION FOR SECOND-CLASS CERTIFICATE OF COMPETENCY.

Technical College, Sydney, 16th January, 1901. 2 p.m. to 5 p.m.

Arithmetic.

- Marks. 6 1. From 5 tons 7 cwt. 1 qr. 11 lb. take 3 tons 13 cwt. 3 qrs. 21 lb., and multiply the remainder by 9.
- 5 2. Reduce 21 cubic yards 12 cubic feet to inches.

Winning and Working of Coal and Shale.

- 9 1. What precautions would you observe in firing shots in a dusty and fiery mine? Whose duty should it be to fire shots, and what precaution should that person take to guard against shots being placed beyond the holing?
- 5 2. In driving a pair of winning places, a fault is met with which throws all the coal out: How would you proceed to recover the seam, providing you do not know whether the fault was an up-throw or down-throw? Illustrate by sketch.
- 5 3. Describe the several systems of haulage; and under what conditions can they be best applied?
- 7 4. Sketch and describe some automatic arrangement for detaching the hauling rope from a train of tubs in motion.
- 7 5. How would you maintain and keep in fair order a main return airway which has 6 feet of soft roof? The place was originally driven 12 feet wide and 6 feet high, and it is necessary to maintain a minimum area of at least 60 square feet.
- 7 6. In a seam full of joints and intersected by faults, what special precautions would you take to guard against falls?

EXAMINATION FOR SECOND-CLASS CERTIFICATE OF COMPETENCY.

Technical College, Sydney, 17th January, 1901. 9.30 a.m. to 12.30 p.m.

Arithmetic.

- Marks. 6 1. A miner's wage is 9s. 3d. per shift, and he works 5½ days per week:
- (a) How much does he earn in three weeks?
- (b) How much will he receive for the same period after a reduction of 9¾ per cent. has been made?
- 7 2. How many gallons will a water-tank hold whose diameter is 3 feet and depth 9 feet?

Winning and Working of Coal and Shale.

- 6 1. How should you arrange the grades on a self-acting incline?
- 8 2. Sketch so much of a district, worked by bord and pillar, as will show the whole followed up by the bracken. Indicate, by arrows, the course of ventilation, the position of doors, regulators, and air-crossings.
- 6 3. Under what conditions would you adopt the long-wall system of working, and what are its chief merits?
- 6 4. Describe the appliances generally used for draining water from dip workings.
- 8 5. What are the advantages and disadvantages of endless rope and main and tail rope systems of haulage? Compare them as regards economy and effectiveness.
- 6 6. Show, by sketch, how you timber a seam 6 feet thick with a good roof and hard floor.

EXAMINATION

EXAMINATION FOR SECOND-CLASS CERTIFICATE OF COMPETENCY.
Technical College, Sydney, 17th January, 1901. 2 p.m. to 5 p.m.

Marks. *Coal Mines Regulation Act, 1896.*

1. What does the Act require regarding—
- 7 (1) Employment of boys?
- 6 (2) Water and boreholes?

Ventilation and Mine Gases.

- 4 1. 120,000 cubic feet of air per minute are passing in the upcast shaft, which is 14 feet in diameter: What is the velocity?
- 6 2. How could you increase the volume of air in a mine, or part thereof, without increasing the power?
- 7 3. Make a sketch of a furnace suitable for the production of 100,000 cubic feet of air per minute in a mine 600 feet deep, and giving off fire-damp.
- 5 4. What are the advantages of ventilating fans over furnaces?
- 7 5. Describe and illustrate, by sketches, three of the best safety-lamps now used.
- 6 6. What is the least amount of fire-damp which will show on an ordinary safety-lamp flame? What is the most explosive mixture?

EXAMINATION FOR FIRST-CLASS CERTIFICATE OF COMPETENCY.
Technical College, Newcastle, 17th July, 1901. 9:30 a.m. to 12:30 p.m.

Marks. *Arithmetic.*

- 7 1. A kilometre is 39,370·79 inches.
(a) What decimal of a mile is a kilometre?
(b) How many acres are in a square of which the side is 1 kilometre?
- 6 2. A bonus of £150 is to be divided among three officials, in the proportion to the time they have been in the employ. The first has served two years and two months, the second one year and nine months, and the third three months. How much should each receive?

Geology.

- 6 1. Describe briefly the geological and climatic influences which contributed to the formation of a coal-field, both in relation to individual seams, and to the field as a whole.
- 5 2. Describe the general character of the coal in one of the coal-fields of New South Wales. Give the approximate composition of the coal in the district you describe, and the commercial use to which it is best adapted.

Surveying.

- 6 1. Describe the operations in making a survey with an ordinary compass and with a theodolite, and state the reasons which would render the use of each advisable.
- 6 2. From the following vertical angles and lengths, on the slope, give the inclination in inches per yard, and difference in level in feet:—

2° 41'	.....	length, 449 links.
2° 4'	.....	„ 411 „
5° 43'	.....	„ 285·3 „

- 7 3. In the following example of levellings, fill in the columns for rise, fall, and reduced levels, and give the average inclination in feet per chain:—

B.S.	F.S.		Distance.	B.S.	F.S.		Distance.
4·75	6·20	..	250 links	4·45	6·75	.....	205 links
1·90	5·15	.....	175 „	3·90	5·85	.....	124 „
7·35	4·70	.....	316 „	5·45	8·15	.....	239 „
3·80	7·95	.....	187 „				

Ventilation and Mine Gases.

- 10 1. A stone drive, 6 feet high and 8 feet wide, has to be driven through gaseous measures for a distance of 200 yards. Explain by sketch how you would ventilate, giving dimensions of material used.
- 12 2. A heading measures 10 feet by 7 feet, and is 1,870 yards long; it is desired to send 35,000 cubic feet of air per minute through it: What pressure would be required to do this? Give answer in feet of air-column, and inches of water-gauge.
- 8 3. A seam is being worked to the rise, bord and pillar working. Explain by sketch if necessary how you would ventilate the “back” workings, assuming the likelihood of falls occurring therein which might liberate and cause the accumulation of fire-damp.
- 10 4. What is the nature of “after-damp” following an explosion, and what is the most important thing to do in order to restore ventilation and recover the men?
- 10 5. Ventilate the accompanying plan, showing all doors, stoppings, air-crossings, regulators, &c.

EXAMINATION FOR FIRST-CLASS CERTIFICATE OF COMPETENCY.
Technical College, Newcastle, 17th July, 1901. 2 p.m. to 5 p.m.

Marks. *Coal Mines Regulation Act, 1896.*

- (1.) What does the Act require regarding—
- 7 (1) Prohibition of single shafts?
- 7 (2) Withdrawal of workmen in case of danger?
- 7 (3) Plan of mine to be kept at office?

Winning and Working of Coal and Shale.

- 10 1. What percentage of coal would you take out at first working under the following conditions:—Seam, 6 feet thick, at depths of 300 feet, 600 feet, and 1,200 feet, respectively, the seam being level and having an average roof and floor.
- 12 2. Explain, in detail, how you would guard against the danger from a coal-dust explosion in a coal mine.
- 10 3. Describe the method of laying the walling-crib in—
(a) Soft and jointy shale;
(b) Hard sandstone.
Explain how you would send a heavy metal crib down the shaft.
- 9 4. Give the names, and approximate composition, of three of the “permitted” explosives. Which, in your opinion, is the safest method of firing shots?
- 8 5. Sketch the laying-out of a pit bottom for an output of 1,000 tons in 8 hours from a depth of 1,200 feet.

Machinery, Boilers, Pumps, &c.

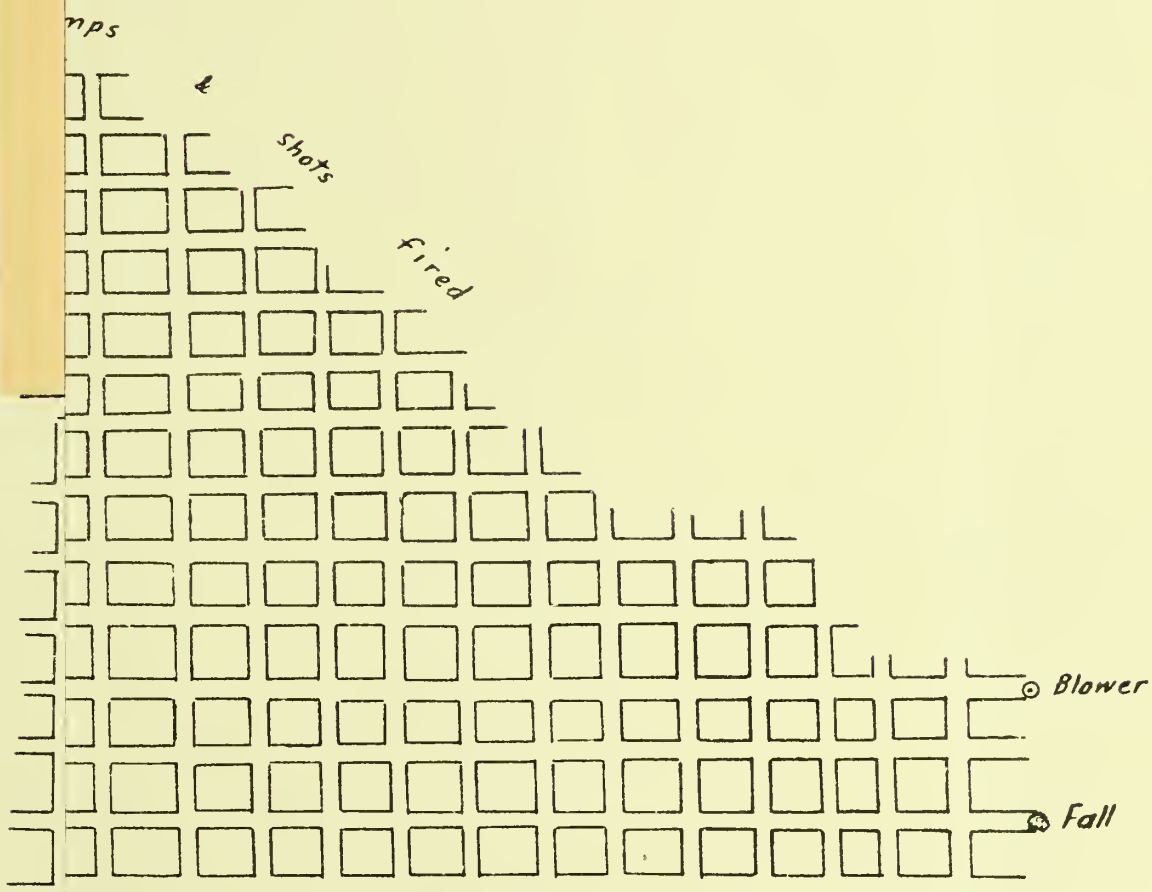
- 8 1. What is meant by the terms: “Unit of heat,” “Unit of work,” and “Mechanical equivalent of heat”?
- 10 2. Make a sketch showing a suitable apparatus for preventing oscillation of the sinking bucket in a deep shaft. Show, in detail, how it is fixed, and what other purpose it sometimes serves.
- 12 3. Show, by sketches, the working barrel, clack seating, and suction pipe (in position in shaft) of a lifting pump.
- 10 4. What, in your opinion, are the principal causes of boiler explosions? Sketch a group of three Lancashire boilers, showing fittings, and how they are connected with each other, and with the engine.

PLAN

1st & 2nd Class.

17th & 18th July, 1901. — Newcastle.

GOA



Lamps & Shots fired

PLAN

1st & 2nd Class.

17th & 18th July, 1901 — Newcastle

Lamps

Candles used & Shots fired

COAF

Lamps

Shots

fired

Lamps

used

Blower

Fall

Return

Intake

Return

Return

Intake

Return

EXAMINATION FOR FIRST-CLASS CERTIFICATE OF COMPETENCY.

Technical College, Newcastle, 18th July, 1901.—9:30 a.m. to 12:30 p.m.

Marks.

Arithmetic.

- 5 1. Add together—
- | | |
|----|----------------------------|
| s. | d. |
| 6 | 9 $\frac{1}{2}$ |
| 17 | 3 $\frac{3}{4}$ |
| 14 | 1 $\frac{1}{2}$ |
| 3 | 8 $\frac{5}{16}$ |
| 7 | 0 $\frac{1}{3}\frac{7}{8}$ |
- 8 2. Two shafts, each 300 feet deep and 16 feet in diameter, and the workings, from which 20,000 tons of coal have been extracted, are full of water: Estimate the quantity of water in gallons.
- 6 3. $\frac{3}{8} + \frac{1}{4}$ of a number is 105 more than $\frac{5}{8}$ of $\frac{1}{4}$ of that number: What is the number?

Geology.

- 7 1. How do you distinguish between igneous and aqueous strata?
- 8 2. Give descriptions of the following geological agencies:—
- (1) Atmospheric;
 - (2) Aqueous;
 - (3) Organic;
 - (4) Chemical.

- 6 3. What is an unconformity, and what does it teach?

Surveying.

- 5 1. Describe the various modes of plotting, with which you are acquainted?
- 5 2. What provision would you make for the fixing of permanent marks, or stations, on underground roads, where the roof is soft and liable to "move"?
- 7 3. An incline rises 1 in 16. What will be the vertical rise in a length of 200 yards, horizontal; and what is the length of the slope?

Ventilation and Mine Gases.

- 10 1. The velocity in an airway is 10 feet per second, with a water-guage of 1·4 inches. What should be the water-guage for a velocity of 12 feet per second?
- 10 2. How does the power required to overcome the friction of air currents in mines vary with the perimeter, length, area, and velocity? If 30 h.p. produce 75,000 cubic feet per minute, how many h.p. would be required to produce 112,500 cubic feet?
- 10 3. Describe, with sketches, the construction of a Guibal fan, 30 feet in diameter and 10 feet wide.

EXAMINATION FOR FIRST-CLASS CERTIFICATE OF COMPETENCY.

Technical College, Newcastle, 18th July, 1901.—2 p.m. to 5 p.m.

Coal Mines Regulation Act, 1896.

Marks.

What does the Act require regarding—

- 7 (1) Means of signalling on planes and in shafts?
- 6 (2) Notices to be given of accidents in mines?
- 6 (3) Daily supervision by Manager or Under-Manager?

Winning and Working of Coal and Shale.

- 10 1. Sketch, and describe fully, some methods of working highly inclined seams of coal.
- 9 2. Show, by sketches, how you would secure the roof and face of long-wall workings, in a level seam 5 feet thick.
- 10 3. State the conditions most favourable for the long-wall system of working.
- 12 4. A property of 1,000 acres has a seam of coal 6 feet thick at a depth of 1,200 feet, with an inclination of 1 in 15. Show, by sketch, how you would develop the property, having regard to the best position for the shafts, and to the system of working to be adopted.
- 10 5. What, in your opinion, is the best and most convenient power to use in pumping water from workings a great distance from the shafts? Describe how you would apply it.

Machinery, Boilers, Pumps, &c.

- 9 1. In sinking a shaft, with large quantities of water, what arrangements would you make for dealing with it, and what class of pump would you use?
- 9 2. Which, in your opinion, is the best method of conducting cages in pit shafts for—
- (a) Moderately deep mines?
 - (b) Very deep mines?
- Describe fully the mode of fixing in each case.
- 13 3. An output of 800 tons has to be hauled in 8 hours along a road a distance of 1 mile, with a grade of 1 in 18 against the load. What system of haulage would you adopt? What h.p. would be required, and what size of engine would you provide, boiler pressure being 100 lb. per square inch?
- 9 4. Draw a section through a steam cylinder and valve chest, showing piston, gland, and all steam parts.

EXAMINATION FOR SECOND-CLASS CERTIFICATE OF COMPETENCY.

Technical College, Newcastle, 17th July, 1901.—9:30 a.m. to 12:30 p.m.

Marks.

Coal Mines Regulation Act.

What does the Act require regarding—

- 7 (1) Inspection before work commences?
- 6 (2) (a) Securing roof and sides? (b) Timbering?
- 6 (3) Ventilation?

Ventilation and Mine Gases.

- 5 1. Describe the general principles of ventilation.
- 4 2. What is the composition of CH₄, CO, and black-damp? State the properties of each.
- 6 3. There are three splits—one to the dip, one on the level course, and one to the rise,—all of equal length and area, and branching from a main intake. Which would take the largest current of air, and why? How would you equalise matters if such were necessary?
- 7 4. In laying out the workings of an extensive mine giving off gas, what are the chief considerations in connection with thorough and efficient ventilation?
- 7 5. Ventilate the workings on accompanying plan, showing doors, stoppings, air-crossings, &c.

EXAMINATION FOR SECOND-CLASS CERTIFICATE OF COMPETENCY.
Technical College, Newcastle, 17th July, 1901.—2 p.m. to 5 p.m.

Marks.

Arithmetic.

- 5 1. A miner is paid $25\frac{1}{2}$ tons at 2s. $7\frac{1}{2}$ d. per ton, and out of the amount pays $5\frac{1}{2}$ days at 5s. 6d. to the filler. How much has he left?
6 2. Subtract 235 tons 17 cwt. 3 qrs. 21 lb. from 540 tons 2 cwt. 1 qr. 27 lb., and multiply the remainder by 37.

Winning and Working of Coal and Shale.

- 7 1. Describe fully, and illustrate by sketches, the methods of working with which you are acquainted.
7 2. Enumerate fully the daily duties of the Under-manager, Deputies, Firemen, and Shot-firers in an extensive mine where safety lamps are used.
5 3. Sketch an air-crossing for a main return in a seam 9 feet thick, and state how it should be made.
7 4. Describe briefly the system of haulage you prefer in a seam inclined 1 in 30 against the lode. Show by sketches the principal parts, such as the mode of attaching load to rope, and the means of guiding the latter round curves.
5 5. What precautions are necessary in a dry mine giving off a little gas—
(a) Before shots are fired?
(b) With a missed shot?
(c) After a shot has been fired?

- 9 6. Sketch and describe the system of working best adapted for a seam of coal of the following section:—

Strong shale roof.	
Coal	3' 0"
Band	0' 1"
Coal	2' 0"
Dirt	0' 10"
Coal	1' 4"
Hard floor.	

Inclination—1 in 8.

EXAMINATION FOR SECOND-CLASS CERTIFICATE OF COMPETENCY.
Technical College, Newcastle, 18th July, 1901.—9:30 a.m. to 12:30 p.m.

Marks.

Arithmetic.

- 6 1. Find the circumference and area of a circle 3 feet 6 inches in diameter.
7 2. Divide 3 tons 2 cwt. 3 qrs. 22 lb. by 56.

Winning and Working of Coal and Shale.

- 6 1. If there are indications of "creep" over a section of the workings, what would you do to check it and secure safety to the miners?
8 2. Show by sketch how you would extract the pillars in a seam with which you are familiar, so as to combine safety and economy in working.
8 3. Describe the operations of sinking and securing a circular shaft, with brickwork, under ordinary conditions.
6 4. What provision would you make to guard against fires in a dry and dusty mine in which naked lights are used?
6 5. What are "slips" and "faces" in roof and coal seam, and what precautions would you take for the safety of the workmen?
6 6. Show by sketch how you would timber a heading, dipping 1 in 4, with a heavy roof and soft floor.

EXAMINATION FOR SECOND-CLASS CERTIFICATE OF COMPETENCY.
Technical College, Newcastle, 18th July, 1901.—2 p.m. to 5 p.m.

Marks.

Coal Mines Regulation Act, 1896.

- 7 1. When a fireman on inspecting the mine finds any part unsafe, what is his duty?
6 2. What does the Act prescribe in connection with water and boreholes?

Ventilation and Mine Gases.

- 6 1. What proportion of black-damp will extinguish lights, and what proportion is dangerous to life?
4 2. How could you increase the volume of air in a mine, or part thereof, without increasing the power?
4 3. What shape or form of airway offers the least resistance to a current of air, and why?
7 4. How would you detect fire-damp, and how would you estimate the percentage of gas present? How would you search for fire-damp in a drawing road, and in a working place?
7 5. Describe how you would measure the quantity of air passing through any part of the mine. Assuming 12,000 cubic feet per minute be passing, at the rate of 3 feet per second, what is the size of airway?
7 6. What are the indications of spontaneous combustion in coal mines? Explain how you would search for gob heating, and how would you proceed to deal with the same, having regard to the safety of the searchers?

The following notices were received during the year of new mines opening out, or in course of development, mines re-opened, sinking pits, driving tunnels, change of ownership, change of management and names of collieries, operations suspended, and mines abandoned.

Opening and Re-opening Mines.

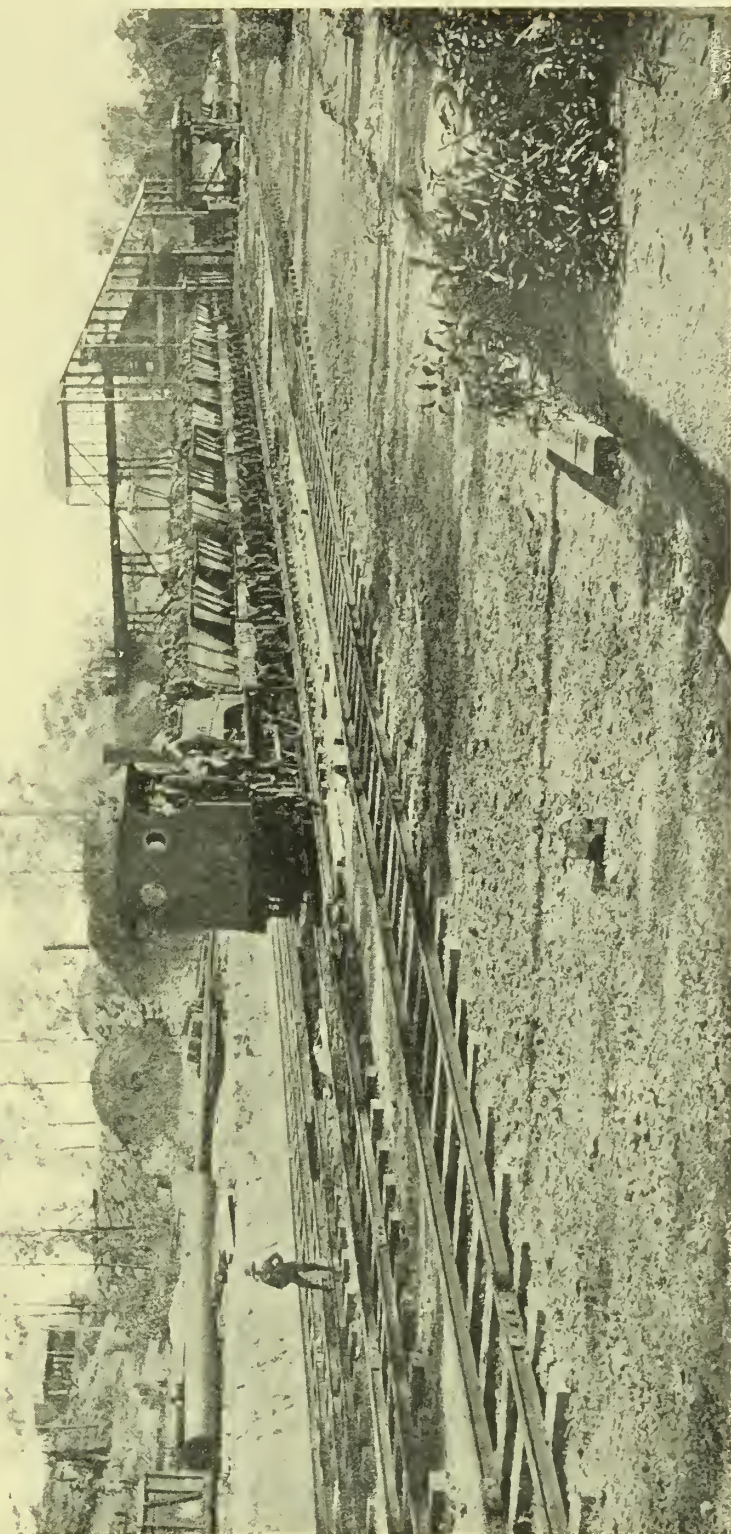
Stanford Merthyr Colliery.—On 4th February, Mr. A. Thomas, agent, notified that the East Greta Coal Mining Company, Limited, were about to commence operations in their recently purchased mine, the Stanford Methyr.

Moonenbah Coal Mine.—On 4th February, George Lindsay notified that he had commenced to open out and work the coal seams by adit level at Moonenbah, Richmond River, Swan Bay, and as part owner and agent, he nominated himself as manager, and asked that a permit be granted to him. Six men working at date of notice.

Ladysmith Colliery.—On 6th February, Mr. P. Scanlon notified that he was prospecting at Four Mile Creek, East Maitland, and that his pit would be known as the Ladysmith Colliery.

Bulli Pass Mine.—On 19th February, Mr. W. T. Philpot, manager, notified that he was starting two men to clear up the No. 3 North Bulli Tunnels for an inspection on behalf of Messrs. Cliff and Hyde.

Fraser's Creek Colliery.—On 10th May, Mr. H. J. Stokes, Manager, Silver Spur Silver Mine, Texas, *via* Stanthorpe, Queensland, asked that a permit be granted to Mr. Reid for their new coal mine at Fraser's Creek, near Inverell; the mine was being leased from Messrs. Nicholls and party for a term of three years from 1st January, 1901.



PELAW MAIN COLLIERY, WEST MAITLAND.

Katoomba Coal Mine.—On 24th May, Mr. R. Vernon Saddington, Secretary, Australian Kerosene Oil and Mineral Company, Limited, notified that the Company had recommenced work at their coal mine at Katoomba.

Knicky Knaek Colliery.—On 26th July, Mr. Francis Dent applied for a mining permit, in order to work the Knicky Knaek Colliery at Waratah, leased from Mr. J. Ellis.

Backworth Colliery.—On 27th July, Messrs. J. Farish and W. D'Arcy, Lambton, notified that on 23rd July they commenced work on the authority held by them under section 28, Mining Act, 1874, and asked that a permit be granted to Mr. J. D'Arcy to act as manager of the colliery which was to be called the Backworth Colliery.

Joadja Incline Coal Mine.—On 10th September, Mr. R. Vernon Saddington, Secretary, Australian Kerosene Oil and Mineral Company, Limited, notified that the Directors of the Company had decided to re-open the Incline Mine at Joadja, and had put on some miners there, but they did not intend to employ more than twenty men for the time being.

Breeza Colliery.—On 23rd September, Thomas Curley asked that a permit be granted to Mr. James Lander, as he had him prospecting for coal at Breeza.

Sinking Shafts, Driving Tunnels, &c.

Four-mile Creek, East Maitland.—On 27th January, Mr. Patrick Seanlon notified that he had started to sink a pit at Four-mile Creek, East Maitland.

East Greta Colliery.—On 5th February, Mr. H. M. Williams, manager, notified that they were about to open up the workings of the top seam with a view of working same. This is a tunnel situated immediately above the No. 2 tunnel.

Wallarrah Colliery.—On 27th February, William Seobie, manager, notified that the Wallarrah Coal Company had begun to open out a tunnel at the southern end of their estate, between the township and the colliery office.

Waratah Colliery.—On 7th March, Mr. Gibson Youll, manager, notified the recommencement of operations in the upper seam at this colliery, where working had been suspended for a number of years.

Mafeking Colliery.—On 13th March, Mr. John Waddell, manager, notified that he was sinking down at No. 1 shaft to the next seam, which he expected to reach at a depth of 90 feet from the surface.

Hanbury Colliery.—On 25th April, Mr. Silas Ruttley notified that he had commenced to sink a trial shaft on land applied for by him near Mr. Harrison's property at Waratah.

Dulwich Colliery.—On 20th May, Mr. W. F. Goodhew, colliery manager, notified that the Singleton Coal and Coke Company intended to sink a small prospecting shaft in an old abandoned heading in No. 1 tunnel from the bottom of present working seam to the Dulwich seam, in order to prove if it is a good workable seam and a good coking coal.

South Greta Colliery.—On 30th May, Mr. James Ralston, manager, notified that he had started a new tunnel to test the top seam on his property.

Woodford Estate.—On 7th June, Mr. Richard Read, Equitable Buildings, Sydney, notified on behalf of W. and T. Longworth and self, that they were about to start prospecting for coal on the Woodford Estate, near East Maitland.

Hectorville Colliery.—On 5th June, Mr. Thomas C. Hector, Awaba, notified that he had been for some time prospecting for coal near Awaba, and was driving and working an adit.

Hanbury Colliery.—On 4th July, Mr. Silas Ruttley notified that he was sinking another shaft near to the one previously worked.

New Greta Colliery.—On 5th July, Mr. John Woodhouse notified that he was about to sink a shaft in Greta, with the object of proving another seam of coal under the present seam there. The place is situated at the back of the Greta Public School.

Hanbury Colliery.—On 12th July, Mr. Silas Ruttley notified that he had bottomed No. 3 shaft in worked-out ground, and, having filled it up, had commenced No. 4 shaft near to No. 3.

Mafeking Colliery.—On 25th July, Mr. John Waddell notified that he had commenced to sink another shaft at Mafeking Colliery, New Lambton.

Hanbury Colliery.—On 12th August, Mr. Silas Ruttley notified that he had commenced to sink shafts Nos. 5 and 6 near previous ones.

Ebbw Vale Colliery.—On 13th August, Mr. James Thomas, manager, notified that he was sinking a shaft to the Burwood seam for ventilating purposes.

Change of Ownership.

Anvil Creek Colliery.—On 11th January, Benjamin Yates, manager, notified that Mr. James Burns was now the owner of the Anvil Creek Colliery, and that Mr. J. R. Baxter Bruce, Solicitor, 20 Bridge-street, Sydney, was agent for the said Mr James Burns. The transfer of the property was completed on 28th December, 1900.

No. 2 Tunnel, Wallsend Colliery.—On 15th January, Mr. H. C. Langwill, manager, Purified Coal and Coke Company, Newcastle, notified that his company was now the lessee of that portion of the Wallsend Colliery known as the No. 2 Tunnel, and that Mr. Alex. Ross, jun., was their colliery manager.

South Bulli Colliery.—On 16th May, Mr. Fred. Waley, general manager, Bellambi Coal Company, Limited, notified that the company had purchased the South Bulli Colliery, and Mr. Geo. Cater would have management of same.

Anvil Creek Colliery.—On 15th October, Mr. Henry S. Forsyth notified that from and after the 19th October Mr. A. Sneddon would take charge of the Anvil Creek Colliery, and that Mr. Forsyth and Mr. Henwood's responsibilities would cease from that date. On 4th November, Mr. A. Sneddon sent a notification to the effect that he had become lessee of the Mine.

Change in Colliery Management.

West Wallsend Colliery.—On 3rd January, Mr. D. McGeachie, manager, notified that Mr. Alex. Lawson had been appointed under-manager.

Anvil Creek Colliery.—On 4th February, Mr. Benjamin Yates notified that his responsibilities as manager would cease from date of notice.

Stanford Merthyr Colliery.—On 11th February, Mr. A. Thomas, general manager, appointed Mr. W. Jones manager for the Stanford Merthyr Colliery.

Waratah Colliery.—On 13th February, Mr. D. McGeachie notified that Mr. Gibson Youll had been appointed manager of the Waratah Colliery.

Killingworth Colliery.—On 13th February, Mr. D. McGeachie notified that Mr. W. B. Pendleton had been appointed manager of the Killingworth Colliery.

Duckenfield Colliery.—On 25th February, Mr. Richard Thomas, agent for J. & A. Brown, notified that Mr. David Durie had been appointed under-manager of the Duckenfield Colliery.

Anvil Creek Colliery.—On 25th February, Mr. H. S. Forsyth notified that he purposed working the Anvil Creek Colliery under the management of Mr. James Henwood, of Dudley, with Mr. Alfred Mason as under-manager.

Metropolitan Colliery.—On 27th February, Mr. D. A. W. Robertson, general manager, Metropolitan Coal Company, Sydney, Limited, notified that he had that day appointed Mr. Joshua Jeffries manager of the colliery.

South Greta Colliery.—On 23rd March, Mr. James Ralston, manager, notified that he had appointed as under-manager Mr. Thomas Shaw.

Irondale Colliery.—On 6th May, Mr. J. B. North notified that, as owner of the Colliery, he had appointed Mr. William Burns manager.

Cardiff Colliery.—On 7th May, Mr. William Johnson, owner, notified that Mr. William Ledger would cease to be manager for the Colliery; and on 8th May Mr. W. Ledger gave notice that his responsibilities would cease after that date.

Cardiff Colliery.—On 7th May, Mr. William Johnson, owner, appointed Mr. James Campbell, with a permit to act as manager in lieu of Mr. W. Ledger.

South Bulli Colliery.—On 16th May, Mr. Fred. Waley notified that Mr. George Cater had been appointed manager in lieu of Mr. J. C. Jones; Mr. Cater also acting as manager of the Bellambi Colliery.

Gunnedah Colliery.—On 17th May, Mr. Frank Leng, secretary, Gunnedah Colliery Company, notified that Mr. Richard Baxter had been appointed manager of the Colliery, *vice* Mr. James Watson, resigned; and on the same date Mr. James Watson notified that his responsibilities would cease from date of notice.

Fraser's Creek.—On 17th May, permit was issued to Mr. W. Reid to act as manager of the Colliery.

Osborne Wallsend Colliery.—On 21st May, Mr. E. Vickery notified that he had nominated Mr. J. C. Jones as manager of the colliery, *vice* Mr. John McGeachie.

Pelaw Main Colliery.—On 22nd May, Mr. Richard Thomas notified that Mr. Morgan Jones had been appointed under-manager of the colliery.

Katoomba Coal Mine.—On 24th May, Mr. Vernon Saddington notified that Mr. Edwards had been appointed manager; and on the 6th June, that Mr. D. Mosby would act as manager during the absence of Mr. Edwards.

Hectorville Colliery.—On 18th June, Mr. Thomas C. Hector notified that he had nominated Mr. John McIntyre as manager of the colliery.

Duckenfield Colliery.—On 29th June, Mr. Richard Thomas notified that Mr. Robert Arbuckle had been appointed under-manager of the colliery.

South Wallsend Colliery.—On 3rd July, Mr. William Johnson notified that he had appointed Mr. James Jackson to act as manager in lieu of Mr. W. Ledger; and on 7th July, notification was received from Mr. W. Ledger stating that he had resigned his position as manager of the colliery.

Rugby Colliery.—On 5th July, Mr. J. J. Poole asked that a permit be issued to Mr. George Juratowitch to act as manager of the Rugby Colliery.

Wallarrah Colliery.—On 27th August, Mr. J. Trewfoot, managing agent, Wallarrah Coal Company, (Limited), notified that on and after the 1st September, Mr. Joseph Sperring would act as manager of the colliery in lieu of Mr. William Scobie.

Wallarrah Colliery.—On 2nd September, Mr. J. Trewfoot, managing agent, Wallarrah Coal Company (Limited), notified that Mr. Richard Marks had been appointed under-manager in lieu of Mr. Joseph Sperring, appointed manager.

Ebbw Vale Colliery.—On 9th September, Mr. James Thomas notified that Mr. William Humphries had been appointed under-manager in lieu of Mr. John Rees.

Lithgow Valley Colliery.—On 17th September, Mr. J. Campbell, manager, notified that Mr. H. C. Croft had been appointed under-manager.

Pelaw Main Colliery.—On 9th October, Mr. Richard Thomas notified that Mr. William Williams had been appointed under-manager.

Bellambi Colliery.—On 14th October, Mr. George Cater, manager, notified that Mr. Clement Jones had been appointed under-manager.

Anvil Creek Colliery.—On 4th November, Mr. A. Sneddon notified that, having become lessee of Anvil Creek Colliery, and Mr. Henwood having resigned the management of same, he appointed himself manager, with Mr. Mason as under-manager.

Stanford Merthyr Colliery.—On 7th November, Mr. A. Thomas, general manager, notified that Mr. Victor Collins had been appointed manager of the colliery, and had entered upon his duties on the 4th November.

Duckenfield and Brown's Collieries.—On 8th November, Messrs. J. and A. Brown notified that Mr. George Durie had been appointed manager of their Minmi Collieries.

Brown's Collieries.—On 18th November, Mr. George Durie, manager, notified that Mr. Robert Arbuckle had been temporarily appointed under-manager of the Nos. 2 and 4 tunnels.

Heddon Greta Colliery.—On 23rd December, Mr. A. Thomas, General manager, notified that Mr. William Ledger had been appointed manager of the Heddon Greta Colliery, and that he entered upon his duties on the 25th day of November.

Change in Name of Colliery.

Pelaw Main Colliery.—On 20th May, Mr. Richard Thomas, manager, notified that the name of the Colliery had been altered from Stanford Greta Colliery to Pelaw Main Colliery.

Operations Suspended.

Morley Colliery.—On 10th January, Mr. Watkin W. Lord, manager, notified that having commenced work at the Gunnedah Colliery he had closed down the Morley Mine for the present.

Lecconfield Estate Tunnel.—On 10th February, notification was received from Mr. R. H. Wyndham, Branxton, that as he was thinking of opening up the seam on a larger scale, he had stopped work and discharged all hands pending machinery, &c., being erected on the surface.

Lineside Colliery.—On 1st May, Mr. F. R. Croft gave notice that he had temporarily suspended operations at the Lineside Colliery.

Rugby Colliery.—On 10th August, Mrs. Martha M. Poole gave notice that she had discontinued operations at the tunnel; and, on 16th August, that work at the shafts on her property had been discontinued for the present.

Centenary Colliery.—On the 16th August, Mr. J. J. Poole gave notice that he was not working the Centenary Colliery Old Tunnel pending alterations to the furnace stack.

Katoomba Colliery.—On 10th September, Mr. R. Vernon Saddington, secretary, Australian Kerosene Oil and Mineral Company (Limited), gave notice that the directors had decided to close down the Katoomba Colliery owing to the difficulty in disposing of coal at the time.

Breeza Colliery.—On 10th October, Mr. Thomas Curley notified that he had suspended operations at the Breeza Colliery, the seam was only about 1 ft. in thickness.

East Greta Colliery.—On 14th October, Mr. Hy. M. Williams notified that work had been temporarily suspended in the Top seam workings. No. 2 Tunnel, East Greta, since 9th September, 1901.

Coal Mines Abandoned.

Bayley's Reward Colliery.—On 31st January, Mr. N. Elliott notified that the mine, Bayley's Reward, had been closed down on 2nd April, 1900.

Morris' Colliery.—On 26th February, Mr. S. Thomas returned manager's permit and stated that with reference to working the mine he intended to do nothing further in the matter.

A. A. Company's No. 2 or Borehole Pit.—On 2nd April, Mr. W. Turnbull, manager, notified that pillar drawing having been discontinued the colliery had been abandoned, and that the downcast and upcast shafts were being filled up with refuse.

Greta Colliery.—On 27th April, Mr. A. E. Webb, secretary to the Greta Coal Mining Company, notified that their mine had been abandoned from date of notification.

Conclusion.

Herewith I beg to hand you the Annual Reports of the Inspectors, Messrs. T. L. Bates, William Humble, and Jonathan Dixon, together with a Report by Mr. James Rowan to the end of November. I am glad to acknowledge the valuable co-operation of these gentlemen during the past year.

The Secretary for Mines was pleased to grant Mr. Rowan leave of absence for six months in order to enable him to proceed to London for medical treatment. He left Sydney on November 30th. In consequence of his departure, Mr. T. L. Bates was transferred to the Southern and Western districts, and the whole of the collieries in the north allotted between Messrs. Humble and Dixon.

In the performance of my official duties, besides making surface and underground inspections, I was engaged for a considerable time in dealing with the matters relating to the weighing of coal and shale; the inspection of Greta Colliery when it was reopened in April last; and the inquest following upon the Burwood explosion. During the year I have travelled 14,628 miles on official duty.

All the official correspondence and reports in connection with the administration of the Coal Mines Regulation Act pass through my hands, and are becoming heavier in volume year by year.

There is, in addition, a good deal of work to do in connection with special reports about the protection of railways, roads, water-works, &c., from damage by mining operations, and also matters relating to mineral leases, mining authorities, royalty accounts, &c.

I have, etc.,

A. A. ATKINSON,

Chief Inspector of Coal Mines.

The Honorable John Kidd, M.P.,

Secretary for Mines and Agriculture.

Mr. Inspector Rowan's Report.

Sir,

Wollongong, 28 November, 1901.

In accordance with section 21 of the Coal Mines Regulation Act, 1896, I have the honor to hand you my annual report for the year 1901.

The total number of collieries under inspection in the Southern and Western districts during the year was 34.

During the term embraced by this report I made 140 inspections, investigated 68 accidents, and travelled about 7,000 miles, exclusive of underground travelling.

Accidents in Mines.

All accidents reported have been investigated; inquests attended in the case of fatal accidents. Of the 68 accidents investigated by me during the year, 65 were non-fatal, and 3 of the accidents, I regret to say, proved fatal. In connection with the fatal accidents, I attended the coroners' inquests and heard all the evidence, and fully reported at the time the verdict of each case as returned by the jury.

I have, &c.,

JAMES ROWAN,

Inspector of Collieries.

The Honorable John Kidd, Esq., M.P.,

Secretary for Mines and Agriculture.

Mr.

Mr. Inspector Bates' Report.

Sir,

Wollongong, 8 February, 1902.

Pursuant to section 21 of the Coal Mines Regulation Act, 1896, I have the honor to submit my Annual Report on the coal-mines under my inspection during the year ending 31st December, 1901.

I carried out my usual duties in the Northern district up to the end of November, when, in consequence of Mr. Inspector Rowan obtaining extended leave of absence, I was transferred to the Southern and Western districts, taking up my residence at Wollongong.

In the year under notice, I have inspected at frequent intervals twenty-four collieries in the Northern district and seven collieries in the Southern and Western district.

Two new collieries have commenced operations in the Northern district, viz., Hectorville and New Greta.

One mine has been abandoned, viz., A.A. Company's No. 2 Pit.

Collieries.

A.A. Company's No. 2 Colliery.—This colliery ceased working on March 22, 1901, and is now abandoned, the winding and fan shafts being filled up.

A.A. Company's New Winning.—There are about 615 men and boys employed at this mine, which is ventilated by means of a Schiele fan, the intakes being the main shaft and travelling tunnel.

Wickham and Bullock Island Colliery, Carrington.—At this mine there are about 212 men and boys employed. The ventilation is produced by means of a Guibal fan, the intake being the main shaft.

Lambton Colliery, Lambton.—About 206 men and boys are employed at this mine, which is ventilated by means of a furnace, the intakes being the main tunnel and various traction shafts. The work consists almost entirely of pillar-coal extraction.

Elemore Vale Colliery, Wallsend.—There are about 112 men and boys employed at this mine. The ventilation is produced by a furnace, the intakes being the main shaft and an air shaft.

Pacific Colliery, Teralba.—At this mine there are about 211 men and boys employed. The ventilation is produced by means of two furnaces, the intakes being the main tunnel and travelling road.

Northern Extended Colliery, Teralba.—About 106 men and boys are employed at this mine, which is ventilated by means of a furnace, the intakes being the tunnel and air shaft.

East Greta Colliery, West Maitland.—At this mine there are about 360 men and boys employed. The coal is drawn from two tunnels in the lower seam, and three shifts are worked. A self-contained Waddle fan has been erected for ventilating the No. 1 tunnel. The No. 2 tunnel is at present ventilated by a furnace, but it is intended to also ventilate this portion of the workings by a similar fan. A little work has been done in the upper seam during the year, but operations are at present suspended.

Heddon Greta Colliery, West Maitland.—This mine is in course of development. There are about 42 men and boys employed.

Stanford Merthyr Colliery, West Maitland.—This mine is portion of what was formerly known as Stanford Greta. Coal is now being sent away, and the mine is being rapidly developed. There are 72 men and boys employed.

Pelaw Main Colliery, West Maitland.—This mine is also portion of what was formerly Stanford Greta. Coal is now being sent away, and the work of opening out is proceeding. About 73 men and boys are employed.

South Greta Colliery, Farley.—There are about 50 men and boys employed at this mine. Coal is only drawn out of one tunnel at the present time. The ventilation is produced by a furnace, the intake being two of the tunnels.

Greta Colliery, Greta.—No coal has been drawn at this colliery during the past year, the mine having been closed in consequence of an underground fire.

Anvil Creek Colliery, Greta.—About 58 men and boys are employed at this mine. The ventilation is produced by a steam jet, the intake being the hauling tunnel.

New Park Colliery, Singleton.—There are about 73 men and boys employed at the two tunnels in connection with this mine. Coal is drawn out of both tunnels. The ventilation is produced by a furnace, the intakes being the tunnels and an air shaft.

Collieries working under permits.

Cardiff Colliery, Cardiff.—About 27 men and boys are employed at this mine, which is ventilated by means of a furnace, the intake being the tunnel.

South Wallsend Colliery, Cardiff.—There are about 25 men and boys employed at this mine. The ventilation is produced by a furnace, the intake being the tunnel.

Teralba Colliery, Cockle Creek.—The unwatering of this shaft has been completed, and the work of opening out the seam of coal is being proceeded with. About 38 men are employed.

Northumberland Colliery, Fassifern.—About 21 men and boys are employed at this mine, which is ventilated by a furnace, the intake being the tunnel.

Liueside Colliery, Awaba.—All work at this mine has been suspended during the year.

Hectorville Colliery, Awaba.—Work of a prospecting nature was carried on during a portion of the year, but all operations are at present suspended.

New Greta Colliery, Greta.—Three men are employed prospecting for coal.

Granbalang Colliery, Singleton.—There are 14 men and boys employed at this mine. The ventilation is natural, the intake being the main shaft.

Dulwich Colliery, Singleton.—There are 10 men and boys employed at this mine, which is ventilated by a furnace, the intake being the tunnel.

Oakvale Colliery, Singleton.—There are 7 men and boys employed at this mine. The ventilation is produced by a furnace, the intake being the tunnel.

Rosedale Colliery, Singleton.—About 14 men and boys are employed at this mine, which is ventilated by means of a furnace, the intake being the tunnel.

Accidents.

Accidents.

Thirty-two accidents were reported and investigated in the Northern District during the year under notice. There was 1 fatal accident and 26 non-fatal underground; also 5 non-fatal on the surface.

The fatal accident occurred to a miner named Roland Alfred Smith, at Stanford Merthyr Colliery, on 16th October, by being crushed between an empty skip and the face whilst crossing the road at the bottom of the main tunnel. An inquest was held, but the jury, failing to agree, were discharged, and no verdict was returned.

With regard to the non-fatal accidents underground, 9 were caused by falls of roof and side; 3 by ignition of powder; 3 by skips; and 11 miscellaneous.

The 5 surface accidents were caused as follows:—1 by chain breaking; 1 by skips; 1 by falling off waggon; 1 by falling off boiler; and 1 by falling on flat-sheets.

A miner named William Henry Down died at the Wallsend Colliery on July 20th under the following circumstances:—After completing his day's work he returned to the surface with his mate, and whilst at the pick-rack, he suddenly fell down, and on the arrival of a doctor was pronounced to be dead. An inquest was held, and a verdict returned that death was due to natural causes, to wit, failure of the heart due to Bright's disease of the kidneys.

I also investigated 7 accidents in the southern and western districts. Three underground and 4 on the surface. Of the underground accidents 1 was caused by the explosion of a shot, injuring 2 men, 1 by a fall of coal and 1 by a skip.

On the surface 1 accident was caused by endless rope; 1 by handle of winch; 1 by locomotive, and 1 by handle of drilling machine.

Prosecutions by direction of the Secretary for Mines.—On April 25th proceedings were instituted against the owner and manager of South Greta Colliery for failing to report a serious accident. Defendant was fined 1s., 7s. costs of Court, and £1 1s. medical expenses.

By Manager against Workman.—On February 28th the manager of East Greta Colliery proceeded against a miner for breach of General Rule 12, section E. Unramming a shot. Defendant was fined 5s., and 4s. 10d. costs of Court.

General Remarks.

In the discharge of the duties above enumerated, I have made 180 inspections, investigated 39 accidents; attended 25 committee meetings of the Miners' Accident Relief Fund; also 4 days at Court, and 2 at inquests, and have travelled 5,916 miles, to and from the various coal mines in addition to a considerable amount of walking underground.

I have, &c.,
THOS. L. BATES, F.G.S.,
Inspector of Collieries.

The Honorable John Kidd, M.P.,
Secretary for Mines and Agriculture.

Mr. Inspector Humble's Report.

Sir,

Hamilton, 3 February, 1902.

I have the honor to report that, in pursuance of section 21 of the Coal Mines Regulation Act, 1896, I have exercised the duties of an Inspector of Collieries in the Northern District during the twelve months ending 31st December, 1901.

In doing so I have inspected the collieries set out in the following table, which shows also the number of underground inspections of each colliery, and, for those regularly inspected by me, the number of men and boys employed above and below ground:—

	Name of Colliery.	Number of men and boys employed above and below ground.	Number of underground inspections given to each.
1	Hetton	433	25
2	Stockton	439	18
3	N. C. M. Co.'s A Pit	451	14
4	N. C. M. Co.'s B Pit	410	16
5	Dudley	349	6
6	Wallarah	232	5
7	Rhondda	154	6
8	Killingworth	233	6
9	West Wallsend	394	11
10	Seaham	448	14
11	Brown's No. 2	506	5
12	„ No. 4		9
13	Duckenfield	343	13
14	Co-operative	409	11
15	Maryland	46	8
16	Bloomfield	16	6
17	Thornley	2	6
18	Kimberley	8	6
19	Morrisett	8	5
20	South Hetton	3	4
21	Ladysmith	3	2
	A. A. Co.'s Sea Pit, 3; A. A. Co.'s (No. 2) 1; Teralba, 1; Northern Extended, 1; and Burwood, 2		8
		4,927	204

In addition to the 204 underground inspections, there have been 20 visits to different mines in connection with Royalty papers, working Sea Coal, &c.

Examination work for Colliery Managers' Certificates took up 15 days, and the remainder of the time, with the exception of three weeks' leave of absence, has been spent in clerical work, attending inquests, &c.

In the performance of these duties I have travelled 1,287 miles, exclusive of that travelled underground.

Accidents.

The number of accidents I have investigated is 70, as against 57 of last year. Six persons were killed and 64 injured. The fatal accidents occurred at Stockton (2), Co-operative 1, Brown's No. 2, 1, N.C.M. Co.'s B pit 1, and Hetton 1; the cause in each case being: Stockton, by fall of coal which threw out a sprag with sufficient force to kill the person drawing it, puncture of big toe by pick, tetanus subsequently causing death; Co-operative, by fall of coal while holing; Brown's No. 2, by fall of roof; N.C.M. Co.'s B. pit, by being caught by full set on engine plane; Hetton, by fall of roof, on wheeling road, which followed the displacement of one of the roadside props.

The 64 non-fatal injuries injured 64 persons. Of these 14 occurred on the surface, the cause in each case being, 1 by machinery, 5 on branch railways and tramways, and 8 sundries.

The cause in each of the 50 underground cases is as follows: 2 by ignition of fire-damp, 2 by explosives, 18 by fall of side, 8 by fall of roof, 1 in shafts, 11 by trams and tubs, and 8 sundries.

Those by falls of roof and sides are 26, as against 27 of last year.

During the year there were two accidents on the surface, both non-fatal, which are not deemed mine accidents within the meaning of section 29.

The first occurred on 15th February on the Seaham and West Wallsend Collieries' branch railway to a boy named Smith, 12 years of age, and not an employee of either colliery. He was riding on the buffer of a loaded coal waggon, and fell off with his arm across the rail. Result, arm almost severed.

The other occurred to a youth named John Lloyd, 20 years of age, a coal carter not employed at the colliery (N.C.M. Co.'s B pit) who, at breakfast time, joined some of the mine employees in the coal hopper engine-room. He was sitting with his foot within the sweep of the crank, and, on the engine being started, several toes were crushed.

The cause of one of the two non-fatal accidents by ignition of fire-damp is of so unusual a nature as to warrant it being placed on record.

A pair of windings, dipping slightly, were yielding a little water and less fire-damp, the latter partly from small blowers issuing from the floor. To enable the miners to keep the face clear of water several empty casks were provided, into which the water was ladled, from where it was afterwards taken by the water-baler, put into the ordinary water tub, and taken outbye.

Ordinarily, the good current of air flowing to the face was sufficient to dilute and render harmless these blowers, but on the day the accident happened, one of the casks had been placed, with its open end downward, in a slight depression in the floor containing water about two inches deep. The blowers of gas through the water entered and collected in the cask which thus became a miniature gasometer. Requiring the cask, one of the two miners, with a naked light on his head, pulled it over and was slightly burnt on the face by the gas thus liberated.

Underground Fires.

During the year there have been 5 fires; 1 by gob heating, 3 traceable to naked lights, and 1 (found burning behind a brick wall in the shaft siding) the origin of which is not clear, but is believed to have been caused by matches, because, after the fire was put out, some match boxes were found among the debris.

That by gob heating was successfully walled off and has given no further trouble, and the remainder were extinguished without serious injury to any person.

It would appear as if the exposed light carried on the head or in the hand is directly responsible for three of these fires, and it is very doubtful if ever we shall be free from a danger of this kind so long as these exposed lights are used in dry mines.

Abandonment.

Ladysmith Colliery, a small prospecting place, after failing to prove a workable section of coal in the Four Mile Creek district, was abandoned towards the close of the year.

Prosecutions.

During the year the Manager of Dudley proceeded against two miners for breach of Special Rules, "taking matches into mine where safety lamps are used." In one case the fine was 5s., and 4s. 10d. costs, and in the other, 10s., and 4s. 10d. costs.

In October, the West Wallsend Manager proceeded against a miner on two charges or breaches of Special Rules, "leaving a missed shot place without erecting a fence," and "crossing a fence in another place without authority." Fined £1, and 4s. 10d. costs, in each case.

In December, the Killingworth Manager proceeded against three miners for breach of Special Rules, "taking pipes and matches into the mine." Fined 10s., and 5s. 6d. costs, each.

I have, &c.,

WILLIAM HUMBLE, F.G.S.,
Inspector of Collieries.

The Honorable John Kidd, M.P.,
Secretary for Mines and Agriculture.

Mr. Inspector Dixon's Report.

Sir,

Newcastle, 10 February, 1902.

I do myself the honor congruent with clause 21 of the Coal Mines Regulation Act, 1896, to submit an Annual Report of my proceedings as an Inspector of Collieries, for the year which terminated on the 31st day of December, 1901.

During the said year I made 203 inspections, and, in addition, gave effect to other official duties categorised as follows:—

Under-ground inspections	185
Above-ground inspections	18
Special visits <i>re</i> coal-weighing appliances, &c.	6
Special work during the unsealing and attempted restoration of Greta Colliery—April, 1901.....	11 days
Inspecting land applied for, also checking Crown royalties	14 „
Attending inquests	14 „
Attending Police Courts	2 „
Special clerical duties evolved from dealing with applications to mine, plans, royalties, and attendance at Coal Fields Office	48 „

Forty-three accidents were also investigated by me.

In the discharge of my official duties, thus synoptically set forth, I journeyed 11,094 miles, exclusive of under-ground travelling.

Mines under Inspection.

Wallsend Colliery, No. 1 Tunnel.—721 persons are employed. The ventilation is induced by the combined powers of fan and furnace. The output is won from whole and broken.

Wallsend, No. 2 Tunnel.—23 men employed. Ventilation by furnace. The whole of the coal winning is from the broken.

Burwood Colliery.—389 employees. Ventilation induced by fan. A portion of the output is obtained from pillar extraction.

Waratah Colliery.—267 persons employed. A small proportion of the output is derived from pillar removal. The ventilation is obtained by fan and furnace.

New Lambton Colliery has employed 96 persons. The working is all whole, and ventilated by furnace power.

Lambton B Colliery has 88 employees, and the coal is won from whole working. The ventilation is induced by fan.

Sydney Harbour Colliery.—Shaft-sinking and surface requirements provided employment for 51 persons. The ventilating fan was operative toward the close of the year.

Gunnedah Colliery employs 41 persons. The work is all whole, and the ventilation obtained by furnace power.

Ebbw Vale Colliery is ventilated by furnace. The work is whole, and 30 persons employed in connection therewith.

Centenary Colliery, Curlewis, has 27 employees. Whole and broken work is performed. The ventilation is produced by furnace.

Shortland's Colliery employs 16 persons. The work is solid, and ventilation assisted by small furnace.

Hillside Colliery.—Whole and broken. Employs 10 persons. Ventilation natural.

Fraser's Creek Colliery, north of Inverell.—7 persons employed. Ventilation naturally produced.

Kayuga Colliery, situated beyond Muswellbrook.—2 persons employed. Whole working aired by small furnaces.

Electric, 2 persons; Redhill, 3 persons; Wright's, 2 persons; Mafeking, 3 persons; Hanbury, 5 persons; and Backworth, 2 persons, are small mines under the provisions of the Act.

Rugby Colliery, also Morley Colliery, in the Gunnedah district, have not been operative since the earlier part of the year.

Morris Colliery has ceased operations.

Johnson's Colliery has been inoperative during the year.

Leconfield Colliery ceased operations after the first three months of the year.

Special visits were likewise paid to the following mines, viz., Greta, Anvil Creek, Pelaw Main, East Greta, Wickham and Bullock Island, Old Lambton, Metropolitan, Elemore Vale, Northern Extended, Seaham, and Duckenfield Collieries.

Conspectus of Accidents.

There were 43 accidents investigated during the year. Four of these resulted in the deaths of 4 persons, and one accident had a dual termination, viz., 3 fatalities, and 3 persons non-fatally injured. Thirty-eight others occurred, injuring 38 persons.

Of these accidents, 38 occurred under-ground, and 5 took place on the surface.

Of the fatal accidents, 2 took place at the Wallsend Colliery, No. 1 Tunnel. In the first case, on 17th January, a miner, 67 years of age, received a broken thigh by a piece of coal falling thereon at the working face. He died on the 2nd of February following. An inquest was held, and after hearing evidence the recorded verdict was, "That deceased died from congestion of the lungs, following on injuries accidentally received in the No. 1 Tunnel, Wallsend Colliery."

In the second case, on the 16th September, a miner, whilst engaged filling a skip, was struck on the back by a slab of stone which fell from the roof. His vertebrae was broken, and death ensued on the 6th of October. Inquest held, and verdict of accidental death recorded.

On the 19th of February a waggon-shunter employed at the Dudley Colliery, whilst lowering out full waggons from the screens, slipped under the wheels. Death was instantaneous. Inquest duly held, and the verdict of jury recorded the death as accidental.

18th of May, at the Rugby Colliery, a miner employed driving a tunnel died from the inhalation of fumes caused by an ignition of brattice cloth and wood. An inquest was held, and a verdict recorded of accidental death.

On the 13th day of November an accident occurred in the Burwood Colliery by an explosion of gas and coal-dust, whereby 3 persons were killed. An inquest was held, and the inquiry was exhaustive, the taking of evidence extending over ten days. The verdict of the jury implied official laxity and neglect.

The

The legal bearing of this implicative finding upon the provisions of the Coal Mines Regulation Act, 1896, and the Special Rules of the Colliery framed in conformity therewith, is *sub judice*.

A death occurred at Wallsend of a miner, the primary cause of which was supposed to be a piece of coal in the ear setting up an inflammation which extended to the brain. This was not considered an accident within the meaning of the Act.

Of the non-fatal accidents, 13 occurred by falls of coal from the working faces; 6 from falls of roof; 8 by skips; 3 on engine planes and flats; 3 by explosion of gas and coal-dust; 1 by ignition of gas; 1 whilst handling explosives; 1 by coal blown out from a shot; 1 miscellaneous.

On the surface 1 occurred to a person whilst lowering full waggons out from the screens; 1 to a banksman by foot being caught in mechanical appliances; 1 to a blacksmith whilst repairing a weighing-machine; 1 to a waggon painter struck by handle of crab winch.

The number of accidents, fatal and otherwise, which occur is one of the regrettable features connected with the world's mining industry.

Too often is humanity shocked by the occurrence of some appalling disaster in one or other of the world's mines.

The prevention of accidents has for very many years exercised the minds of our greatest philanthropists and mining engineers, officials, workmen's representatives, and others skilled in, and closely identified with, the mining industry.

Whilst in the direction indicated much has been done to minimise the risk attendant upon coal-mining operations, there is room for still further advancement in the way of preventing many of the accidents we are yet called upon to investigate and chronicle.

For palpable illustration, accidents may be designated as of two kinds, viz., preventable and non-preventable.

In explanation, it may be stated that the "preventable" are those which could be avoided by a strict, positive, and faithful discharge by officials of the functions allotted to them.

Too often mine officials unintentionally collude with workmen in breaches of discipline by the exercise of a sympathy, which is as mistaken as it is false and injurious in effect, when dispassionately considered relative to accidents which occur as the outcome, direct or indirect, of such laxity.

Officials can do much to avert accidents by a courteous, yet firm and rigid, insistence that the various rules framed to govern operations be observed and adhered to.

Thus will their part be carried out towards maintaining the necessary discipline for the safe conduction of operations and prevention of accidents.

On the other hand, correlative with the functions incumbent upon officials, is the all-important duty devolving upon workmen, viz., individual responsibility applicable to their own personal safety, and likewise the general safety of their fellow workmen.

In too many instances workmen do not attach that consideration to the purport of the rules framed for their safety which the said rules demand.

If they would become imbued with the knowledge of individual responsibility, and give effect thereto, they would at all times direct their energies towards a voluntary observance of the rules, from the application of which should emanate a maximum degree of safety.

A plain fact to those cognisant with coal-mining operations is that custom of the workman to base his judgment as to the condition of his working place, and thereby the measure of his safety, upon "sounding" with the pick or maul.

This indicator is not sufficiently conclusive as a gauge of safety. The fallacy of placing sole reliance upon such tests is borne out by the frequency of accidents which indisputably occur from that cause.

Accidents have taken place, fatal and otherwise, during the currency of the year under review where, had the rules requiring sprags, &c., been given effect to, the said accidents would not have occurred.

In the face of these severe and drastic object lessons, it is not too much to hope that workmen will impartially feel and act the principle of individual responsibility.

That is, each man, whilst being responsible in a large degree for his own safety, is likewise responsible for the safety of his fellow workman.

It is fair to contend that, if this spirit maintained conjunctively with faithful official supervision, the yearly casualty list would pleurably diminish.

I would term non-preventable, or pure accidents, as those which occur after every precaution is taken that human skill and foresight can devise, and that happen after a strict compliance with rules.

There is, and always will be, risk associated with mining, and it might be said that pure accidents are the outcome of normal risk, whilst the preventable accidents are the result of imprudent action on the part of individuals whereby abnormal risk is unnecessarily brought about and then taken, and that too often with injurious termination.

The safeguards are to hand, the methods of their practical adoption are known to those concerned, and it only remains for their application at all times to consummate what has been expressed.

Prosecutions.

By direction of the Minister.—On the 15th April the manager of the Centenary Colliery, Curlewis, was proceeded against for breach of General Rule 14—"Not providing refuge places on an engine plane." Pleading guilty. Fined £5 and 4s. 10d. costs, or 6 months gaol.

24th July.—The manager of Rugby Colliery was proceeded against for breaches of General Rule 4—1st, not making inspection before work commencing. 2nd, not entering same in a book, &c. Pleading guilty. A fine of £1 and 4s. 10d. costs imposed, or 14 days.

By manager against workmen.—On the 5th of March the manager of New Lambton Colliery proceeded against a miner for infringement of Special Rule 71—"Stemming a blasting hole with a naked light attached to the cap on his head." Pleading guilty. Fined £1 and 5s. 6d. costs.

On the 27th March the manager of Burwood Colliery proceeded against two wheelers for a breach of Special Rule 28—"Going into a part of the mine, other than where they were employed, without permission." Each fined 1s. and 4s. 10d. costs of Court.

The manager of Waratah Colliery, on the 10th of May, proceeded against a miner for breach of Special Rule 43—"Stemming hole with light on cap." Also breach of Sub-sec. D., General Rule 12—"Stemming hole with iron drill." Pleading guilty. Fined £2 and 5s. 6d. costs each offence, or 2 months imprisonment each offence.

Inspections by Workmen.

The provisions of General Rule 39 have been availed of at most of the Mines.

Underground Fires.

In one mine during the year a fatality occurred, resulting from an ignition of brattice cloth and the wooden framework to which it was attached.

Some 3½ chains of bratticing were erected in a heading in which two men were employed.

One man had occasion to go out of the mine, leaving his mate at the face.

From statements made, the inference is, that the "naked light" carried outbye was, unconsciously to its bearer, the cause of ignition.

On his return into the mine he discovered the brattice cloth towards the outbye end to be one sheet of flame.

All efforts to speedily subdue the fire failed, and the unfortunate mate was subsequently found near the face suffocated by the poisonous fumes inhaled.

Another incident, which occurred in one of the large mines, is plainly illustrative of what might have been had the event taken place in a district more vigorously ventilated than was necessary at the spot.

At 3 30 p.m. all appeared right from casual observation.

The 10 p.m. deputy going his usual rounds found that in a bord 40 yards of brattice cloth had burnt or smouldered away to a tinder. Naked lights were in use.

In another mine, a deputy going his daily rounds found a brattice door on fire. Naked lights used in passing to and fro.

Another instance, proved beyond a doubt, where the careless use of a naked light had set fire to a piece of dry brattice cloth attached to the bottom of a wooden door.

This fire was first discovered by smoke noticed ascending upcast shaft. Some difficulty was experienced in its subjugation.

During the year the majority of collieries have adopted a more rigid system of examination after knock-off time, whereby it is ascertained that all workmen, requiring to be, are out of the mine, also that fire is not left to generate.

This is commendable, and the benefit resulting from the practice warrants its continuance.

There are three recorded instances where the "persons appointed" discovered fires in an inceptive state which, without such timely discovery, might have been attended with disastrous results.

Shooting Fast.

In view of the inflammable nature of the coal dust of most of our mines, the practice of "shooting fast" is highly reprehensible.

There is a record in one mine of a shot being fired in the solid in a hole 4 feet deep. The coal was blown a distance of 34 feet.

The mine is dry, and the dust is inflammable.

Another instance in the same mine of a fast-shot being fired was that a slight ignition of dust took place, and 24 feet from the shot-hole distilled and partially eoked dust was to be found on the props.

It is right to state that the officials appear fully cognizant of the attendant risk, and have endeavoured to prevent recurrences of such indefensible practices.

Overwinding.

During the year two instances of overwinding occurred at one mine. The ropes are fitted with patent detaching hooks, and special "catches" are fitted in the headgear to receive the cage when such accidents take place.

On both occasions the appliances acted most effectively, and no serious consequences resulted.

I have, &c.,

JONATHAN DIXON, M.E.,

Inspector of Collieries.

The Honorable John Kidd, M.P.,

Secretary for Mines and Agriculture.

ANNUAL REPORT OF THE GOVERNMENT GEOLOGIST.

Geological Survey of New South Wales,

Department of Mines and Agriculture,

Sir,

Sydney, 15th January, 1902.

I have the honour to hand you my report on the progress of the Geological Survey for the year 1901.

As usual, a considerable proportion of my time and that of the Geological Surveyors has been occupied in inspecting reserved land and reporting upon proposals by the Lands Department to alienate portions of it. It is necessary to exercise great caution in dealing with proposed revocations of reserved lands, inasmuch as the proportion of the public estate which is reserved for mining purposes is steadily becoming smaller, and, although recent enactments provide for the working of gold and other minerals on alienated lands, the necessary procedure involves some expense and loss of time to the miner, and there is no doubt that prospecting is much more likely to be successful when the prospector has unrestricted access to the land.

During the year I was engaged in the field for 124 days, the balance of my time being occupied by routine work in Sydney.

Early in the year my book on "The Mineral Resources of New South Wales" was published. It was very favourably reviewed in Europe, America, and Australia, and has had a considerable circulation.

On the 27th February I visited Mount Kosciusko with Professor David and Mr. Richard Helms. The object of the trip was to settle the disputed question as to the occurrence on the mountain of evidence of glacial action. We discovered the most unmistakable evidence (part of which had been previously recorded by Mr. Helms, but subsequently denied by others) of the former existence of glaciers. Some fine photographs were taken of striated pavements, striated roches moutonnées, moraines, erratic blocks, and grooved and striated boulders; on the 27th March we read a paper before the Linnean Society, recording the results of our investigations.

In May, having been appointed a member of the Royal Commission to inquire into the state of the opal mining industry (in association with yourself and Mr. Warden Fletcher), I visited White Cliffs, and assisted in the inquiry, and subsequently in the preparation of the report of the Commission.

On the 20th June I furnished the following report on the newly-discovered deposits of tin at Buddigower:—

I have inspected the deposits of tin ore on Buddigower Run. They are situated on Crown Lands in the parish of Buddigower, county of Bourke, about 12 miles south-west of Wyalong. The prospector is Mr. John Smith, who has been mining for some years in the district, and who was also the discoverer, several years ago, of some stream tin deposits at Narriah (to the north of Yalgogrin), which, however, were not proved to be of any extent.

The formation in which the tin deposits at Buddigower occur is granite close to its junction with slate. The granite has intruded the slate, and, as is generally the case, the junction of the two formations follows a very irregular course. Within a distance of a few yards of this junction the outcrop of a quartz lode occupies the summit of a small granite hill, forming part of the watershed between the Lachlan and the Murrumbidgee Rivers. The lode appears to be about seven or eight feet wide; its course is E. 5° S., and it dips towards the north at an angle of perhaps 60°.

Near the summit of the hill the outcrop of the lode is covered by about a foot or more of granite soil, and in this occur loose angular boulders, or shode stones, of almost pure greyish white cassiterite or tinstone. These boulders vary in size, the largest hitherto found having been nearly thirty pounds in weight. An assay of one of them showed that it contained at the rate of 73½ per cent of metallic tin. There is every reason to believe that the boulders have been shed from the quartz lode by the denudation of its upper portion or outcrop. Up to the present time no bunches of tinstone at all comparable in size to the loose boulders have been found in the quartz lode, but the latter is seen to contain veins and impregnations of tin ore, chiefly in connection with arsenical pyrites (mispickel). Very little prospecting has, however, yet been done, the deepest shaft being less than 10 feet, and until the lode has been opened up to a considerably greater depth it would be impossible to form a reliable opinion as to the chances of the deposit proving payable.

A number of other smaller quartz lodes, which strike in various directions, have already been found to contain tin, and it is possible that some of these may prove to be branches of the main lode. At least five other leases are at present on ore containing a proportion of tin, but in no case has sufficient work been done to prove whether the deposits are of a payable character. The five leases referred to are:—Tully and Leadbitter's 40 acres to the south of the Prospectors; Tully and Leadbitter's 40 acres to the west of the Prospectors; Lindsay and Channon's 40 acres to the north of the Prospectors; McMillan and Party's 40 acres to the east of the Prospectors; May and Party's 25 acres, known as No. 2 East.

The Prospector's lease (Smith's) is the only one where the loose boulders or shodes tinstone have been found.

In conclusion it may be said that the occurrence of these shode stones of rich tin ore at the surface is without a doubt very encouraging evidence, but that much more work will require to be done before the Buddigower deposits can be said to have been sufficiently prospected to admit of an expression of opinion as to their commercial value.

On the 9th August I had the honour to submit the following remarks in forwarding a report by Mr. J. B. Jaquet* on a proposal to erect Government Smelting Works at Broken Hill:—

A very large sum of money would be required to erect such works, and the cost of salaries, maintenance, &c., would be considerable.

The ores from the "outside" silver and copper mines would require to be concentrated before being fit for smelting, and, consequently, it would be necessary to erect expensive concentrating machinery at each mine, and to provide an adequate water supply in each case, in addition to the central smelting works at Broken Hill.

The experience of the large Broken Hill Mines has proved that it is much more economical to smelt their ores at the seaboard than at the mines, because it costs less to convey the ore to the coke than to bring the fuel to the ore. But just when business men have shown by their experience (extending over a long period) that it is not economical to smelt Broken Hill ores at Broken Hill, and just when the richest mines in the world have removed their smelting furnaces from that field, the Government is asked to erect expensive machinery there for the purpose of treating ores under less favorable conditions.

At

* See page 167.

At the present price of lead and silver the ores from the majority of the Broken Hill mines cannot be profitably treated, even under the most favourable circumstances at Port Pirie. The profitable treatment at Broken Hill of less valuable ores from the outside shows would, therefore, be out of the question, especially when the cost of concentration and cartage to the proposed Government smelting works is taken into consideration.

I was always of opinion that the Sydney Government Metallurgical Works would be a failure, and the costly experiment which has been tried in connection with them has proved that this opinion was correct. There is only one field in the world (viz., at Freiberg) where Government metallurgical works have been successful, and there the conditions are quite distinct from those which exist in this country.

In Freiberg the ores from State-owned mines are treated at the Government works. In New South Wales the mines are not State-owned.

If the Government undertakes to smelt ores for private individuals, under the conditions existing around Broken Hill, it must necessarily do so at a great loss. Each mine-owner would probably require his parcel of ore to be separately treated, and the cost of doing this would be very great. Public smelting works, or customs works as they are sometimes called, are managed on entirely different lines, for ores are purchased on the basis of their assay values, and by the judicious mixture of ores of different character, but which are suitable for smelting in conjunction, the economical treatment of the whole is effected.

The establishment of Government smelting works at Broken Hill would, in my opinion, be equivalent to the subsidising of individuals to work deposits which are not payable, and there seems to be no justification for bolstering up an industry at the expense of the general taxpayer. Moreover, there is no probability that the mining industry would be really benefited by such a course. If payable deposits exist in the country around Broken Hill there can be no doubt whatever that they will be worked without Government assistance, and, conversely, if the mines cannot be worked without the assistance of Government smelting works, this is in itself a proof that the deposits are not payable.

In conclusion I venture to most strongly recommend that the application for Government smelting works be refused, as I feel confident that they could only result in great loss to the State, and also that they would interfere with the healthy progress of the mining industry.

On the 23rd October I furnished a report on the Euriowie and Waukeroo Tin-fields, as follows:—

In accordance with the Minister's instructions I have visited the tin-fields of Euriowie and Waukeroo. These tin-bearing deposits have already been described in detail twice. In the first instance they were examined by my predecessor, the late Mr. C. S. Wilkinson, vide Annual Report for 1886, p.p. 141-143. Eight years later they were described by Mr. Geological Surveyor Jaquet, vide "Geology of the Broken Hill Lode and Barrier Ranges Mineral Field," 1894.

The mines are practically in the same state to-day as they were when the above reports were written, so that I can do little more than confirm the descriptions already given.

In the year 1886 a large number of people was engaged in prospecting the tin-bearing lodes or dykes, and a considerable amount of work was done in sinking and driving. Much of the labour was, however, ill-directed, and this fact must have been, to some extent, responsible for the ultimate abandonment of the mines. For instance, there are examples on the field of vertical shafts put down for a depth of say 100 feet on the foot wall side of a lode, so that the deeper they were sunk the farther they receded from the deposit, and, subsequently, they were abandoned without any attempt being made to reach the lode by crosscutting.

As already described by Messrs. Wilkinson and Jaquet these deposits are not true lodes, but intrusive dykes of coarse graphic granite, or pegmatite. The bounding country rocks consists chiefly of micaceous schist. The tin ore occurs scattered through the pegmatite in grains or crystals of all sizes up to 2 inches or more in diameter. It is occasionally accompanied by tourmaline, but no wolfram or other objectionable mineral is present. The pegmatite is not uniformly impregnated, much of it being barren; in fact the ore probably occurs in chutes, the average dimensions of which cannot, however, be stated, in view of the small amount of actual developmental work done.

When the rush to these deposits took place in 1886, the conditions for economic mining were unfavourable, inasmuch as the ore had to be carried about 50 or 60 miles to Broken Hill, and this fact, in conjunction with the low price of tin, and the reckless and unskilful manner in which the prospecting was carried out, was doubtless responsible for the cessation of mining operations.

At the present time the price of tin is materially higher, and there is a railway from Tarrawingee to the sea coast, so that the ore or concentrates would only have to be carried by wagons for a maximum distance of 10 or 15 miles. Under the circumstances I am of opinion that some of these mines should be payable, if worked on commercial principles. The ore presents no special difficulties in the way of extraction or concentration, and the tinstone is clean and eminently suitable for economic smelting. The topography of the country is specially favourable for the conservation of water, for there are rocky gullies, in which large dams could be constructed, in proximity to most of the largest tin-bearing dykes. The only point on which further information is required is the extent of the chutes of payable ore, in other words there has not been sufficient systematic developmental work to warrant the erection of machinery in the majority of cases.

It may be thought that under these circumstances aid might be granted from the Prospecting Vote to further develop some of these deposits with a view of attracting capital to the fields. Such a plan would, I think, be justifiable if the grant could be satisfactorily expended in such a way that the benefit would be reaped by the public and not by the individual; the difficulty in the way is, however, that all the more promising deposits are held under mineral lease, and the lessees appear to have "shepherded" them for years, barely complying with the labour conditions, in the hope of being able to attract capital to "float" their mines in a more favourable market. It is a question therefore whether the lessees, under such circumstances, can be considered deserving of Government aid.

With regard to the suggestion that parties of unemployed miners should be subsidised by the Government to prospect these tin-fields I have no hesitation in expressing the opinion that it should not be entertained. It is necessary to state in the first instance that this method of casual prospecting by parties of miners was given an extensive trial some years ago, and that it proved, in every case, an absolute failure. The Minister then decided that, in future, aid from the Prospecting Vote should only be granted for work of a specified nature, on the recommendation of the Board, and that the payment should in no case exceed 50 per cent. of the actual cost per foot.

Moreover, the actual work of locating the tin-bearing dykes in the Euriowie and Waukeroo Fields has already been done. Hundreds of miners were prospecting the locality in 1886, and the dykes are easily visible on the surface, as the white pegmatite stands out in marked contrast to the darker country rocks.

Finally, it may be remarked that at the present time there are few, if any, skilled miners out of employment at Broken Hill; on the contrary, I was informed that the manager of the Proprietary Mine could not obtain as many miners as he required.

The following report on the Clear Creek Gold-field was furnished by me on the 17th December:—

In connection with the application for a Government battery in the Bathurst District I have to report that I have visited the Clear Creek Gold-field, and have inspected twenty-three claims situated on alienated land in the parish of Peel, county of Roxburgh. Brief particulars of the work done are given hereunder.

Sinclair and Party.—Undoubtedly the most important claim on the field at the present time is that of Sinclair and Party, which is situated on portion 26. The lode, which varies in width from 1 to 6 feet, has an average width of about 3 feet. Its strike is N. 50° E., and it dips N. 50° W. at an average angle of about 40°. Seven shafts have been sunk on the course of the lode, the deepest being about 150 feet on the underlay. The deposit has been stoped to a depth of about 80 feet from the surface, and about £4,000 worth of gold has been extracted, the stone at the present time being said to contain at the rate of about 1 oz. per ton. The owner of this claim has a battery of five head of stamps, situated on Clear Creek, about 1½ mile from the mine, and in addition to treating his own quartz he has done some crushing for the public, his charges being at the rate of 15s. per ton.

Moore and Party.—Moore and Party's claim adjoins Sinclair's on the north-west. A vertical shaft has been sunk with the object of intersecting Sinclair's reef on the underlay, and a reef of considerable width, which is in all probability the one sought for, has just been met with at a depth of about 130 feet. No stone had been extracted at the time of my visit, so that the value of the deposit at this depth has still to be tested.

Ingersole

Ingersole and Party.—Ingersole and Party's claim adjoins Moore's on the north-west, and here a distinct line of reef has been opened. It has a north and south strike, dips east at an inclination of about 50°, while its width is about 4 feet. An inclined shaft, 45 feet deep, has been sunk on the lode, and 30 tons have been crushed. This stone was poor, the best of it only yielding at the rate of 3 dwts. 10 grs. per ton. This reef was also opened in Moore's claim, where a shaft of 50 feet deep on the underlay was sunk. The reef was 2 feet 6 inches wide at this point, but the stone was also poor.

R. Wilson's Claim.—About 300 yards east of Sinclair's mine a vein of white quartz, showing some galena, was opened by R. Wilson. A shaft 8 feet deep has been sunk, and a small trench has been cut, showing the vein to have a width of about 10 inches. Some specimens containing good gold are said to have been obtained at first, but subsequently the stone became poorer, and very little prospecting work has been done to ascertain whether there is any likelihood of its improving. No stone has been crushed from this claim.

Machattie's Claim.—About a quarter of a mile south-east of Wilson's there is a large white quartz blow, which may be the continuation of the reef just mentioned. This land is held by Machattie and party. Beyond a few pot holes no prospecting has been done, and no stone from the claim has been crushed.

Guillam and Party.—On the north of and adjoining Sinclair's mine Guillam and Party have sunk a vertical shaft to a depth of 38 feet in the hope of striking the continuation of Sinclair's reef. Up to the present, however, the reef has not been located in this claim.

Martin and Party.—A claim held by Martin and Party is situated about 1 mile and a quarter north of Sinclair's. The reef varies in width from 1 to 2 feet; its strike is north-west, and it dips to the south-west at an inclination of 50°. Two shafts (inclined) have been sunk, their depths being 15 and 35 feet respectively, and 25 tons of quartz have been treated for a yield of half an ounce per ton.

Slade and Party.—To the west of and adjoining Martin's a claim has been pegged out by Slade and Party with the object of working the continuation of Martin's reef. The only work hitherto done, however, consists of some shallow trenching, and nothing of importance has been proved.

Tanner and Party.—About three quarters of a mile to the west of Slade's claim is one held by Tanner and Party. Here four shafts, the deepest of them being about 18 feet, have been sunk in the bed of a gully or dry watercourse. The reef is lenticular, its maximum width being about 2 feet, and it consists of banded quartz and slate, with chlorite, galena, and a considerable proportion of mispickel. Five tons of this stone are said to have yielded 19 oz. of gold at Sinclair's battery, and another parcel of 12 tons was subsequently treated but the result was not stated. About 6 tons of stone are now at grass.

The claims hitherto referred to are all situated on the eastern side of the Bathurst-Limekilns road; those about to be described are on the western side of that road and between it and the township of Peel.

Patterson and Party.—Patterson's claim is situated on the banks of Clear Creek, close to Gilmour's battery. There are two shafts 35 feet and 20 feet deep respectively. In the former, which was an abandoned shaft and which has just been cleaned out by this Party, there is a 4-inch vein, the value of which has not yet been proved. In the 20-foot shaft there is a lenticular vein, the greatest width of which is about 1 foot. The stone at the surface was white and poor in quality, but a make of ironstained stone has recently been struck which shows gold freely. This reef strikes N. 10° W. and is nearly vertical, the dip being westward. There are about 4 tons of stone at grass, a considerable portion being of poor quality, while the remainder consists of the richer stone above referred to.

Dunn and Party.—About a quarter of a mile east of Patterson's is Dunn's claim. It contains a vein from 4 to 6 inches wide showing occasional colours of gold. The only work done consists of a couple of small holes, the deepest being 8 feet.

McCudden and Party.—To the north of Dunn's, and on the opposite side of the creek, is McCudden and Party's claim. A few pounds of stone containing very rich gold are said to have been picked up on the surface of this ground, but so far prospecting operations have not been successful in disclosing the reef from which these specimens were derived. Some trenches and a shaft, 17 feet in depth, have been excavated.

Palmer, Fox, and Party.—Palmer, Fox, and Party have a claim to the north of McCudden's. They have put in a tunnel 29 feet long on a narrow vein (2 to 6 inches wide). A crushing of 4½ tons of stone from this vein yielded 7 oz. 15 dwts. of gold. At the end of the tunnel a cross reef about 2 ft. 6 in. wide has just been intersected and the stone from this gives good prospects. There are about 2 tons of stone at grass. A shaft about 10 ft. deep has also been sunk, and the tunnel is being produced to connect with this so as to provide better ventilation.

Payne and Party.—About 1 mile south of Patterson's is Payne and Party's claim, where a small trench has been cut on a vein about 3 inches wide. No other work has been done and there is no stone at grass.

Pearce's Claim.—Pearce's claim is also about a mile south of Patterson's and to the westward of Payne and Party's. There are two small shafts—one 10 feet deep and the other 5 feet. In the former there is a vein of about 18 inches wide which dips to the east, while in the latter a lenticular vein, from 2 inches to 1 foot in width, has a north and south course and dips to the west. A crushing of 9 tons of stone from this claim yielded at the rate of 4 dwts. per ton. There are about 2 tons of stone at grass. This Party has just been granted aid from the Prospecting Vote to sink their shaft.

Sutherland and Party.—About a quarter of a mile south of Pearce's claim is Sutherland's. The reef is exposed in a shaft 10 feet deep and is seen to have a north-west course, the dip being to the north-east. The maximum thickness of the reef is about 1 foot. No stone has been crushed. There is another shaft 22 feet in depth, and there are about 5 tons of stone at the surface. Aid has just been granted to continue sinking the shaft.

Jennings and Party.—A large white reef—15 feet wide at the surface—outcrops about half a mile to the south-west of Sutherland's and is held by Jennings and Party. A shaft 30 feet deep has been sunk but has not as yet intersected the deposit. Judging by the appearance of the quartz at the surface the prospects are not very encouraging.

Mitten and Party.—Half-a-mile south of Jennings, there is another very wide outcrop of white quartz. A shaft 70 feet deep has been sunk on this deposit, and a crosscut at the bottom shows the reef to be at least 23 feet wide. The quartz has for the most part a barren appearance, and a parcel of 96 tons, which was treated at Mitten's battery on Clear Creek, yielded at the rate of only a little more than 1 dwt. per ton. At the bottom of the shaft, however, a shoot of stone heavily charged with mispickel has been met with, and it is stated that a sample of this yielded by assay at the rate of 6 oz. of gold per ton.

Martin, Suttor, and Party.—Martin, Suttor, and Party have a claim in the neighbourhood of Mount Conqueror, at the back of Gilmour's battery. Several shafts and open cuts have been excavated on a fairly wide reef, which yielded from 10 to 12 dwts. per ton, but the shoot of gold was subsequently lost, the stone becoming too poor to pay.

Sinclair and Party.—Sinclair's mine is situated to the north-west of the last named. The reef, which strikes north-east and dips to the south-east at an angle of 45 degrees, is lenticular in character and varies in width from a few inches to 2 feet. The surface stone has been extracted by means of an open cut, and a parcel of 20 tons of stone has been crushed for a yield of ½ oz. per ton. There are about 6 tons of stone at grass.

Brett Brothers.—Bretts' claim is situated on the north-west slope of Mount Conqueror. The reef is about 4 feet wide, and a crushing of 10 tons of stone was just being finished at the time of my visit. It was expected to yield about half an ounce per ton.

Martin Brothers.—On the western slope of Mount Conqueror, Martin Brothers are prospecting a reef about 3 feet wide. An open cut has been excavated, showing the reef to have a north and south course and to be nearly vertical. One parcel of 7 tons of stone crushed locally yielded 7 oz. of gold, and another parcel of 6 tons was treated at Dapto and yielded at the rate of 18 dwts. per ton. There are about 12 tons of stone at grass.

Mount Conqueror Mine.—On the eastern side of Mount Conqueror, and near its summit, is the Mount Conqueror Mine. The reef is lenticular and very variable in width, ranging from a few inches to as much as 8 feet. Its course or strike is N. 10° W., and it dips towards the east at an inclination of 20°. There is a shaft 90 feet deep, and at the bottom of this the reef is about 2 feet wide. A considerable quantity of stone has also been extracted from an open cut.

The following is a list of the crushings from this mine :—

10 tons yielded	20 oz.
14 " 	37 "
15 " 	16 "
27½ " 	30½ "
66½ " 	103½ "

Or at the rate of 1 oz. 11 dwts. 2 grs. per ton on the average.

Prospects of the Field.—It will be gathered from the foregoing account of the mining operations on the Clear Creek Gold-field that, in a large majority of cases, prospecting operations are at present in the initiatory stage, and that there are only two or three claims upon which the exploratory work has been carried far enough to warrant the opinion that the deposits are likely to be permanently payable. At Sinclair's and Mount Conqueror the crushings have proved that fairly wide deposits of good ore occur, and in several other instances the prospects are certainly promising. On the other hand, several of the reefs which have been opened have yielded discouraging prospects, though it must be admitted that in these cases sufficient work has not been done to allow of a conclusive test of their productiveness.

Existing Batteries.—There are three small batteries at present on the field, and within easy distance of the various claims. Gilmour's battery is on Clear Creek, about half-a-mile above Mount Conqueror. It consists of five stamps, weighing about 7 cwt. each, and crushing is done here for the public at the rate of 12s. 6d. per ton.

Mitten's battery is on portion 26, parish of Peel. It consists of four head of stamps, weighing about 6 cwt. each, and the owners crush for the public at the rate of 10s. per ton. Sinclair's battery is on his own land, adjoining the eastern boundary of portion 26. It contains four head of stamps, weighing between 7 and 8 cwt. each. This battery is mainly employed in crushing stone from Sinclair's mine, and the owners are therefore not anxious to crush for the public. Nevertheless some public crushing is done, the rate charged being 15s. per ton.

The proposal to erect a Public Battery.—In dealing with the proposal to erect a Government battery, reference must first be made to the suggestion by a member of the deputation to the Minister, viz., that it was necessary that a Government battery be established to meet the requirements of the whole of the Western District—say, from Nyngan around by Mudgee, and from Bathurst to Hill End.

A little consideration will show that this suggestion would be quite impracticable. It is generally considered that 1s. per ton per mile is a fair rate for the cartage of ore over ordinary bush roads, and it is evident, therefore, that the expense of carting low-grade quartz for a distance of more than (say) 10 or 15 miles to a battery would be altogether prohibitive. If average auriferous quartz is to be treated economically, the battery should be in proximity to the mine; if it be situated at a greater distance (say) than 10 miles, it becomes a question whether a margin of profit can be obtained, and this will of course depend upon the value of the ore.

The next question to be considered is that of the necessity for the erection of a Government battery at Clear Creek.

I have already shown that there are at the present time only two mines which are producing what may be regarded as moderate quantities of stone for crushing, and that, of the other claims on the field, a few have promising prospects, but very little development work has been done upon them.

I have also stated that there are, in proximity to these claims, three batteries which are prepared to crush for the public at prices ranging from 10s. to 15s. per ton.

It was stated at the deputation that the price charged by the owners of these batteries was too high, and I ascertained from some of the miners that they considered 7s. per ton would be a fair charge. In my opinion 10s. per ton is a very reasonable rate, considering the small amount of stone that appears to be forthcoming, for it must be remembered that there are expenses connected with a battery while it is kept idle; but in any case, I think there can be no doubt that private enterprise will always be ready to erect larger batteries, and crush for a fair rate, provided it can be shown that a sufficient quantity of quartz will be available to keep the batteries at work. The difference between the price at present charged (viz., 10s.), and the price suggested by the miners (viz., 7s.), only represents the value of three quarters of a pennyweight of gold per ton, and I certainly do not think the field is in such an advanced state that any claim-holder would be able to demonstrate that three-quarters of a pennyweight of gold per ton represents the difference between profit and loss in regard to the crushing of his stone.

It is also extremely improbable that a Government battery could, under existing conditions, be made to pay its way, if the rate for crushing were fixed at a lower sum than that charged at Mitten's battery; for it is a well known fact that Government institutions are more costly to conduct than private establishments, where strict economy may be expected.

I have no hesitation in stating that in my opinion the request for a Government battery at Clear Creek should not be complied with, as the requirements of the field are at present fully met by private enterprise, and there is no reason to doubt that increased accommodation will be provided as soon as it can be shown that sufficient stone is available for crushing.

If a Government battery were granted for Clear Creek, I can only say that I do not know a single gold-field in the State where a similar request could consistently be refused.

The operation of sinking the main shaft of the Sydney Harbour Collieries Co. at Balmain was followed with considerable interest, especially towards the end of the year when it was known that they were approaching the horizon of the Bulli coal seam. Unfortunately, when the seam was reached, it was found to have been split up into several comparatively thin seams. The manager having asked for an expression of opinion from Professor David and myself, the following joint report was submitted by us :—

REPORT ON THE COAL SEAMS STRUCK IN THE SYDNEY HARBOUR COLLIERIES MINE AT BALMAIN.

In accordance with the request of the manager of the Sydney Harbour Collieries Limited, we have the honour to furnish the following report on the coal seams struck in the deep shaft at Balmain.

The first seam was met with at a depth of 2,889 feet, and proved to consist of 2 ft. 4 in. of coal, 3 feet of carbonaceous shale, 2 inches of inferior splint coal, and 8 inches of soft bituminous and splint coal. The dip of this seam was 1 in 40 in a direction E. 15° N.

At a depth of 30 feet below this a second seam 1 ft. 8 in. thick of bituminous coal was met with. The dip of this seam was E. 43° N. at 1 in 17.

At a further depth of 15 ft. 10 in. a third seam was penetrated. It consisted of 3 inches black shale, 3 inches cannel coal, and 8 inches of carbonaceous clay slate with thin streaks of coal. The seam was dipping N. 13° E. at the rate of 1 in 11.

At Cremorne, the first coal seam met with in the diamond drill bore at a depth of 2,917 feet had a total thickness of 10 ft. 3 in., and considerable disappointment is naturally felt at the reduced thickness of the coal at Balmain, which site is about 2½ miles west of Cremorne.

We are of opinion that the diminished thickness of the coal at Balmain may be regarded as a purely local variation, and that the main seam here has (as not unfrequently happens in the Coal Measures) been separated into several thinner seams by lens-shaped beds of shale and sandstone.

There

There can, we think, be no doubt whatever that the first seam met with at Balmain is the upper portion of the main Bulli seam, which is also the one penetrated in the Cremorne bore. This opinion is based on the marked similarity between the geological details of the sections obtained in the bore at Cremorne and in the shaft at Balmain. Further proof is supplied by the paleontological evidence available; for at a short distance above the first seam in the Balmain shaft was found the fossil plant *Schizoneura*, which has hitherto only been met with immediately overlying the Bulli seam.

The small bore, which has reached a total depth of more than 100 feet below the first seam at Balmain, has, in our opinion, supplied further proof that the three seams intersected by the shaft are all portions of the main Bulli seam; for it has proved the occurrence of several other small seams, the aggregate thickness of which, added to that of the three seams in the shaft, approximates to the total thickness of the main seam at Cremorne.

As already stated, we believe that this separation of the main seam into bands which are too thin to be economically worked is merely local, and that at a certain distance from the shaft they will be found to reunite into a seam of commercial value. It is, of course, an unfortunate circumstance that the shaft should have been put down just where this splitting up of the main seam occurred. Still we believe the difficulty can be overcome by driving along the upper seam; and as, in any case, it would have been necessary to leave a large shaft pillar of unworked coal for the support of the shafts, it will be seen that the absence of workable coal in the immediate vicinity of the pit bottom is not a matter of much consequence.

We estimate that the first and second coal-seams should unite at a distance of between 300 and 400 yards in a south-westerly direction from the shaft (*i.e.*, in the direction of the full rise), provided their inclinations continue at the same rate and in the same direction as they are seen to be in the shaft. A drive in this direction would, however, be under private land, and therefore it would be necessary in the first place to drive from the pit bottom towards Cockatoo Island for such a distance as would allow a south-westerly branch drive being put in to clear White Horse Point. We also recommend that this drive be extended in the opposite direction—*i.e.*, towards Greenwich.

Mr. Geological-Surveyor J. E. Carne's time was principally devoted to continuation of the geological survey and examination of the kerosene shale deposits of the State and their associated geology. During the year geological maps were prepared or completed by him of the following localities:—

1. Portions of the Capertee and Wolgan Valleys, showing the kerosene shale deposits of The Gullies, Capertee River, Wondo, Capertee Nile, Green's Gully, Lamb's, and Lower Wolgan.
2. Map showing outcrop of the Bathgate kerosene shale seam between Wallerawang and Marangaroo.
3. Map of Cumbermelon Range and portions of the Ilford and Mount Marsden Ranges, showing the Ilford, Mornington, and Mount Marsden shale deposits.
4. Map of Hartley, Sugarloaf, and upper portion of Grose Valley, showing Hartley Vale, Sugarloaf, and Victoria Falls kerosene shale deposits.
5. Map of portions of Megalong and Jamison Valleys, showing the Ruined Castle, Megalong, and Blackheath kerosene shale deposits.

Mr. Carne's examination of the two known shale deposits of the Burragarang and Little River Valleys did not disclose any features of sufficient importance to necessitate geological survey.

The Joadja Creek kerosene shale deposit was also surveyed and examined by the same officer before the close of the year, and the work is now being plotted.

The material for Mr. Carne's memoir on kerosene shale is now within measurable distance of completion, and it is to be hoped that the volume will be ready for the printer some time during the first half of the current year.

During the geological survey of the areas embracing kerosene shale deposits, Mr. Carne was ably assisted by Mr. Malcolm Morrison, field assistant.

On the 9th of August, Mr. Carne furnished the following report on a discovery of gold on portion 765, parishes of Cunningham, Currawong, and Murrumbidgee, county of Harden:—

I have the honor to report having examined the site of the recent gold discovery within the land defined herein as homestead selection No. 765, in the parishes of Cunningham, Currawong and Murrumbidgee, county Harden.

The find is genuine, three claims being on gold, two of which are certainly payable. About thirty men are on the field. Four camps are established, but most of the prospectors reside at the Old Blind Creek Diggings, about 2 miles distant, or in Harden and Murrumbidgee.

Gold was discovered here about five or six weeks ago by the prospectors—Medcalf and Party—who are residents of Blind Creek Diggings. According to their statement, they prospected the land as soon as they found out that it had been made available by exchange, because they were under the impression that a continuation of the Blind Creek leads existed in this locality. They also claim that they were first made aware of it being opened by the rail made upon the land by local settlers for timber. Whatever suitable timber for rough fencing work was available has since been removed, the area being covered with waggon and dray tracks. The remaining timber is only suitable for firewood.

Gold was found at a depth of 10 feet on the side of a low ridge, and has been traced into 33 feet ground at the lower end of the prospecting claim, and is still dipping. In No. 2 West, the lead was not reached at 45 feet. Owing to influx of water, and the small dimensions of the shaft, work had to cease. A new and larger shaft a little further south struck the side of the lead, which will be followed on the dip towards the first shaft.

In the next claim west of the lead an Albury party is down 34 feet, and is now engaged timbering and arranging for a pump to cope with the water. If payable gold is struck here—as there is strong likelihood—the future of the field will become more assured.

Samples washed from small paddocks of dirt at two of the prospectors' shafts yielded payable results. From the richest portion of the gutter, near the west boundary of the same claim, a dish of dirt yielded over 1 dw. of gold in my presence.

The adjoining claim, the shaft in which is but a few feet from the last-mentioned, prospects even better according to report.

The wash runs from 6 to 12 inches in thickness; its width, however, has not yet been proved. The country is granite.

Medcalf and Party washed six loads from their first discovery for 3 dwts. 7 grs. per load, but some of the dirt was not from the bottom. Five loads, at a later date, yielded 5 dwts. 2 grs. per load, and the wash now being raised promises considerably more.

A careful examination of the area revealed no trace of previous prospecting. The discovery is in portion 56, parish of Cunningham, close to the road, on its west boundary. The Albury party's deep shaft is on the opposite side of the road, in portion 35.

Gold is also reported in portion 213, but as the day of inspection was wet the prospectors were not on the ground.

In its features this ground is similar to the Blind Creek diggings near by, and though the gold is likely to be patchy it is probable that a poor man's diggings may be located hereabouts. Under these circumstances, I strongly recommend that the area in question be held for mining, or until such time as it has been adequately tested.

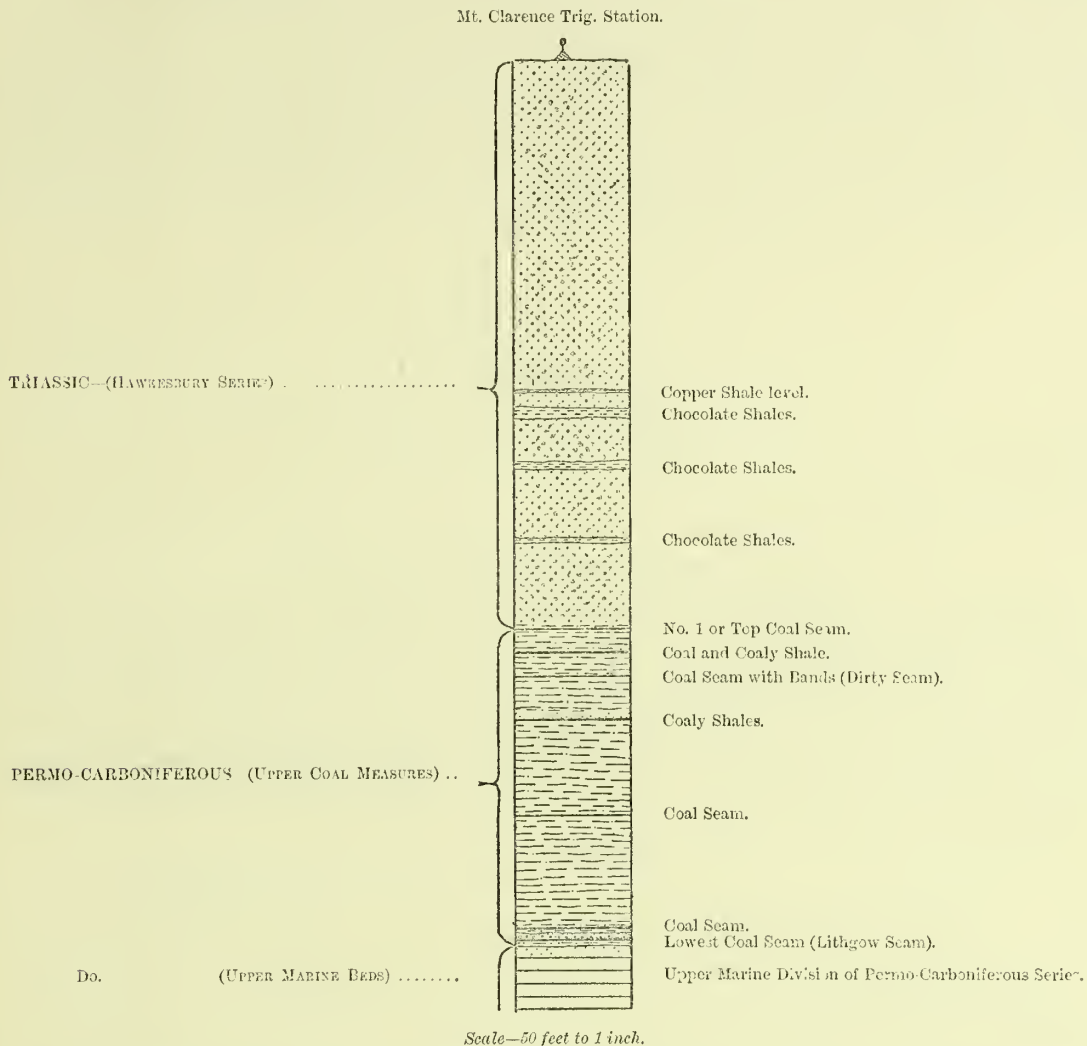
Mr. T. S. Huntley, having asked for information as to the strata underlying Mount Clarence, Mr. Geological-Surveyor Carne reported, on the 3rd October, as follows:—

The information contained in the accompanying section has been prepared on the verbal instruction of the Under-Secretary, who was interviewed by the applicant prior to the written application.

Mount Clarence is the highest point in the locality, and, therefore, shows an abnormal thickness of the Hawkesbury series overlying the Coal Measures. A considerable proportion of this thickness could, however, be avoided in sinking by choosing a site as low down its slopes as is consistent with a suitable grade to the Great Western railway line.

In sinking, the chocolate shale bands will afford excellent data for determining the horizon reached and distance from the Coal Measures.

I am of opinion that kerosene shale will not be encountered in this section.



VERTICAL SECTION SHOWING THE PROBABLE SEQUENCE OF STRATA BENEATH MOUNT CLARENCE TRIGONOMETRICAL STATION, PARISH OF LETT, COUNTY OF COOK.

The Commonwealth Cement Company, Portland, having asked for information as to the probability of obtaining coal beneath the seam worked in the Ivanhoe Colliery, Piper's Flat, the following report was received from Mr. Geological-Surveyor J. E. Carne:—

I have the honor to report having visited the Ivanhoe Colliery on the 16th instant for the purpose of advising on the probability of finding a coal seam beneath those now opened.

The geological data obtainable at the site are conclusive against such a probability, as the lower or working seam at the Ivanhoe Colliery is identical with the lowest (or Lithgow) seam of the Western Coal-field. Any expenditure, therefore, in sinking below this horizon would be absolutely wasted.

The foregoing copy of a section of the strata on the Hartley side of the range between Hartley and Lithgow gives a fair idea of the relative positions of the principal coal seams in that neighbourhood. It might, perhaps, be forwarded to Dr. Scheidel to illustrate the positions of the coal seams at the Ivanhoe Colliery.

Mr. Geological-Surveyor J. B. Jaquet was occupied for a portion of the year in examining and reporting upon land reserved for mining purposes. He was also engaged in completing his Memoir on "The Iron Ore Deposits of New South Wales," which was published by the Government Printer about the middle of the year. It forms a most valuable work, and, while reflecting great credit on the Department, will probably be the means of inducing capitalists to initiate the iron-smelting industry in New South Wales. Mr. Jaquet's work shows that, so far as the quality and quantity of the iron ores of the State are concerned, there is nothing to prevent the successful introduction of this important industry.

On 1st April, Mr. Jaquet furnished the following report on the Yambulla Gold-field:—

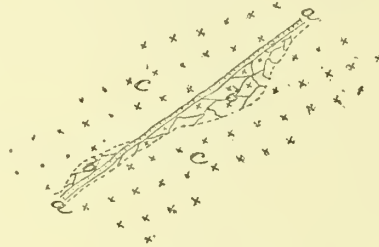
Yambulla Gold-field is situated near the Victorian border, in the parish of Yambulla, about 40 miles from Eden, in a south-westerly direction.

The country is granite. The gold occurs in narrow fissure veins which traverse the granite, and in the altered country rock immediately adjoining these veins. I have attached to this report a sketch showing a typical section through one of the ore deposits. At least thirty or forty distinct veins have already been discovered, and fresh ones are being found every day. They seldom exceed 3 inches in width, and are of a permanent character. The country upon the walls of the veins has in many places been replaced by auriferous quartz.

It more frequently happens that these masses of replaced country or "swellings of the reef," as they are described by the miner, are only found at intervals along the reef, but in some instances, as in the case upon the Yambulla Company's property, they occur as a band of considerable thickness, which is everywhere present along the vein.

The ore consists of slightly ferruginous quartz above the water level, and of quartz with a variable amount of pyrites underneath. In some reefs, notably the one occurring in Hoff's Federal Mine, there is a considerable amount of galena associated with the unoxidised ore.

The quartz from the veins proper is generally very rich. It contains from $1\frac{1}{2}$ oz. to 6 oz. of gold per ton. The impregnated country which accompanies the veins is much poorer. The ore is refractory, and only a portion of the gold is obtained upon the battery plates; a large proportion passes into the tailings. As an illustration of the character of the ore I will give the results obtained upon crushing a parcel of 23 tons of rich ore from Duffy and Party's claims at the Razorback, obtained above the water level. Gold at the rate of 5 oz. per ton was obtained upon the battery plates, the tailings were found upon assay to contain 1 oz. 17 dwt. per ton, and 8 oz. of concentrates were obtained, which yielded at the rate of 9 cz. per ton. When such heavy losses occur in treating ore even from near the surface it is obvious that the ore obtained from beneath the zone of oxidation may be utterly unsuitable for treatment by an ordinary stamper battery. From ore containing a large percentage of galena, like that being raised from the lower levels of Hoff's Mine, a certain proportion of valuable smelting ore could be obtained by hand-picking.



a. Fissure vein from 1 to 6 inches thick. b. Granite partly replaced by auriferous quartz. c. Granite.

IDEAL SECTION THROUGH AN AURIFEROUS VEIN AT YAMBULLA.

The great majority of the reefs have not yet been explored below the oxidised zone, and hence we can only conjecture as to the general character of the sulphide ore.

Hoff's Federal Mine.—This is the prospector's claim. It was here that gold was first discovered by a miner named Byrne about a year ago. A main shaft has been sunk to a depth of 103 ft., and at 40 ft. levels have been driven in an easterly and westerly direction, which are 57 ft. and 33 ft. long respectively. The reef varies in width from 1 in. to 2 ft. 6 in. Below the 40 ft. level there is much pyrites and galena associated with the ore. About 200 tons of ore have been stoped from above the 40 ft. level, and from this ore 150 oz. of gold were obtained upon the battery plates.

About 200 yards from Hoff's Claim in a westerly direction, and about 100 feet higher up the slopes of Spion Kop Mountain, Messrs. McCloy, Jarvis, and Walls have commenced to drive a tunnel upon what is probably the same vein. The reef, as seen in the face of the tunnel, is about 1 ft. to 18 in. wide. It is well defined, but chiefly composed of impregnated country.

Still further up the hillside Messrs. Roberts and party have sunk two shafts to depths of 60 ft. and 30 ft. respectively upon a promising-looking vein, and raised several parcels of stone which yielded upon treatment as under:—

Amount of ore.	Yield of free gold.	
5 tons	46 oz.	5 dwt.
4 „	12 „	9 „
25 „	37 „	10 „
33 „	25 „	0 „

Greig's claim.—Here a vein has been worked in an open cut. It varies in thickness from a few inches to 2 feet. From 17 tons of ore 29 oz. of free gold were obtained.

Lindwall's claim.—Four distinct veins have been opened up in this claim and three shafts, which are 54 ft., 35 ft., and 33 ft. deep respectively, have been sunk; 47 tons of ore have been crushed for a yield of 59 oz. 10 dwt. of free gold.

C. Thompson and Party's claim.—A shaft has been sunk to a depth of 40 feet upon a well-defined reef which averages about 9 inches in width. The shaft passed out of the zone of oxidation at a depth of 30 feet, and below this level the reef is heavily charged with pyrites. Thirty-six tons of ore have been crushed for a yield of 56 oz. of free gold, and at the same time 11 cwt. of tailings were obtained, which, upon assay, were found to contain gold at the rate of 7 oz. per ton.

Wood and Dunn's claim.—The reef running through this claim is from 2 inches to 1 foot wide, and has been traced at the surface along a steep rocky slope for a distance of 150 feet. A shaft has been sunk to a depth of 60 feet, and a tunnel has just been started at a point about 100 feet east of the shaft. Both in the face of the tunnel and in the bottom of the shaft the vein is well defined. Ten tons of ore have been crushed for a yield of 21 oz. 2 dwt. Fifteen tons are now going through the battery, and are expected to yield 3 oz. per ton.

Yambulla Gold-mining Company.—The reef and the impregnated country which accompanies it has an average width of about 5 feet, and is of a permanent character. The greater portion of the gangue consists of country (granite) more or less impregnated with auriferous quartz.

The main shaft has been sunk to a depth of 110 feet, but I was unable to examine the reef below a depth of 80 feet where a level has been driven along the vein. A 10-head stamper battery has been erected upon the bank of the creek below the mine, and crushing is now in progress. No returns, however, are available, and I am unable to give any particulars concerning the gold contents of the ore.

Duffy, Faulkner, and Party's claim.—This is situated at the Razorback, about 4 miles from the township of Yambulla on a southerly direction. The reef is well defined, and trends in an easterly and westerly direction. A shaft has been sunk to a depth of 60 feet, and at this depth levels have been driven which are in the aggregate 180 feet long.

Parcels of stone have been crushed as under:—

Quantity of ore.	Yield of gold upon battery plates.	
10 tons	10 oz.	
8 „	14 „	
23 „	116 „	

Summary.—In my opinion the field is an important one. The reefs are for the most part small, but they are well defined, yield a rich ore, and there are a large number of them.

Near the surface the country is soft, and a large proportion of the gold is free, but at a depth very hard country will be encountered, and the ore will probably be refractory. Parties of miners unprovided with capital are able to work the upper portions of the veins, and the field has given employment to two or three hundred men. There is but little doubt that fresh reefs will continue to be discovered from time to time, and that these, in the aggregate, will yield a large quantity of gold.

On the 19th December, Mr. Geological-Surveyor Jaquet furnished a report on auriferous deposits at Nungatta, County Auckland :—

I have the honour to inform you that, in accordance with your instructions, I have examined the recently-discovered auriferous deposits ("Delany's find") upon Settlement Lease Portion 104, parish Nungatta, county Auckland.

The site of the discovery is distant about 7 miles from the township of Yambulla.

The country is granite, identical with the rock in which the reefs occur at Yambulla. In my report upon this (Yambulla) gold-field, I stated that the gold occurred in narrow "fissure" veins of permanent character, and also in the country along the walls of these veins which had been either impregnated or replaced by ore.

Much of the ore raised by Delany's find undoubtedly consists of country (granite) either partly or completely replaced by auriferous quartz and pyrites. It is probable that one or more fissure veins will be found traversing the deposit, and that these will prove of great assistance as indicators when sinking operations are commenced. These veins, if present, could not be readily distinguished in the existing workings, which are in broken and decomposed rock and have in no instance reached a greater depth than 15 feet. From an excavation upon the cap of the ore body, 30 feet long, 60 feet wide, and from 12 to 15 feet deep, two parcels of very rich ore and a quantity of "seconds" have been obtained, one parcel of 23 tons yielded upon crushing 34 oz. of free gold and the other parcel of 98 tons 315 oz. of free gold.

Having regard to the superficial character of the work already carried out one would not be justified in expressing any decided opinion as to the extent or value of the deposit at the present time. However, I regard the discovery as an important one, and I think it extremely likely that other auriferous deposits will be found in the vicinity and over a large area of country where the same geological formations obtain.

Delany's find is situated upon Por. 104.

Valuable reefs have been worked at "the Razorback," Por. 103, and I think it very probable that the belt of country between these deposits will prove to be auriferous if efficiently prospected.

On the 13th May, Mr. Jaquet reported as follows on the copper-lodes of Crowl Creek, 17 miles south-west of Nymagee :—

I have the honour to inform you that in accordance with your instructions I have examined the newly-discovered copper-lodes which are situated at Crowl Creek, parish of Hume, county Mouramba, about 17 miles from Nymagee in a south-westerly direction.

Attention was first directed towards these deposits by an aboriginal (Jacky Owen), in November last. The fact that they remained undiscovered so long is somewhat remarkable having regard to the fact that stains of green copper can be seen upon the face of a slate cliff in the vicinity.

The country consists of slate and schists, which are identical with the Cobar copper-bearing formations. The copper ore does not occur in a lode with well-defined walls and a distinctive gangue, but scattered in bunches or pockets throughout the country. Some of the ore consists of slate with a slight impregnation of copper carbonate, and this ore can be seen passing by insensible gradations into one composed almost entirely of copper carbonates, grey ore, and red oxide with a gangue of quartz and oxide of iron.

The most promising deposit hitherto discovered is situated upon Osmetti and party's claim. Here a band of slate impregnated with copper carbonate has been exposed for a distance of 75 feet.

An open cut has been carried down upon the ore to a depth of 18 feet, and in the bottom of this cut there is a good body of excellent ore exposed which is at least 7 feet wide. Already 16 tons of ore have been raised and despatched to Cockle Creek Smelting Works for treatment, and a start has been made to raise and bag another parcel of 40 tons.

Upon the prospector's claim a shaft has been sunk to a depth of 40 feet in a decomposed schist which is more or less impregnated with copper carbonate.

In Messrs. Kirwin and party's claim a little carbonate ore has been discovered upon the surface, and at a depth of 30 feet a bunch of rich ore, composed of carbonate and red oxide of copper, has been encountered. A vertical shaft is now being sunk with a view of cutting the lode at a depth of 50 feet upon the underlay.

Having regard to the little exploratory work already carried out, I am not able to speak definitely concerning the prospects of the field, but the discovery of so fine a body of ore in Osmetti's claim should certainly encourage further prospecting.

On the 4th June, Mr. Jaquet furnished the following report on the Burragorang Silver-field :—

I have the honour, in accordance with your instructions, to furnish you with a report upon the Burragorang Silver-field.

This field was reported upon by the Government Geologist, Mr. E. F. Pittman, during June, 1899, (Ann. Rep. Dept. Mines and Agric., 1899, p. 162), and it would seem only necessary for me to give an account of the more recent developments upon the field.

During last year (1900) it is estimated that silver and lead to the value of £9,125 were produced from the field.

The most productive mine is that owned by Mr. J. W. Bartlett (P.G.L.I.). The lode has been proved by two underlay shafts to depths of 153 and 156 feet respectively, and at these depths it is well defined and yields a rich ore. It has an average width of about 1 foot 6 inches and underlays at an angle of 29° in a southerly direction. A large proportion of the ore sent away is of a high grade character, but no detailed returns are available.

Great interest is at present centred in attempts that are being made to cut the reef upon the underlay along the southern boundary of Mr. Bartlett's lease. Messrs. Kerry and Party have erected a boring plant and have commenced boring operations upon M.L.I., and Messrs. Taylor and Party have commenced to sink a shaft in their claim to the west of M.L.I. After making a rough survey (*vide* attached plan) I estimate that the lode should be encountered both in the borehole and shaft at depths between 400 and 500 feet.

Many objections can be urged against the employment of a percussion-boring plant for prospecting operations of this character. The Burragorang silver-lodes are "fissure veins," and they will probably be found to extend for long distances both in vertical and horizontal direction, but the ore shoots, or those areas of the lode which yield an ore of payable character, are limited in extent; indeed, in places we find the lodes composed only of a thin layer of clay (fluccan). So it is possible that at the particular point where the borehole penetrates the lode no galena or other easily recognisable ore may be present, and even should rich silver ore be encountered and a powdered sample more or less mixed with material from the adjacent rocks be raised to the surface, information as to the extent of the ore will still be wanting. The problem to be solved is not only whether Bartlett's lode extends under the land in question, but also whether the rich shoot now being exploited near the outcrop of the lode in P.G.L.I. extends there also. In my opinion the question can only be satisfactorily answered after a shaft has been sunk and levels driven.

Having regard to the trend of Bartlett's lode, it should be picked up upon the portions immediately east of P.G.L. 1.

Lode material, which may perhaps represent a portion of Bartlett's lode, has been found upon these blocks, but no payable ore has been discovered.

Further east again, in the Euranderic mine, P.M.L. 3, a well-defined fissure vein, which may be an extension of Bartlett's lode, is being worked. The lode is from 2 inches to 1 foot in thickness, and has perhaps an average thickness where exposed of about 6 inches. It dips south at an angle of 26 degrees, and includes a long shoot of payable ore. An underlay shaft has been sunk upon the lode to a depth of 250 feet, and levels have been driven as under :—

No. of level.	Depth from surface.	Length.
1	107	150
2	140	96
3	200	38

About 200 tons of ore have been sent away from the mine and smelted at the Sulphide Corporation's Works, Cockle Creek. The proprietors of the mine have been kind enough to place in my possession the Smelting Company's returns from all the parcels of ore sent away. The richest parcel contained 118 ozs. of silver per ton. The gold contents varied from 4 dwts. to 7 dwts. per ton. The ore contains upon the average about 80 ozs. of silver and 5 dwts. of gold per ton, and 7 per cent. of lead. It is composed of a highly argentiferous galena, with frostings of native silver and a little red silver ore.

The

The lode extends eastward from the Euranderie into the Mayes mine. Near the western boundary of the Mayes mine two shafts have been sunk to depths of 73 and 115 feet respectively, and a level has been driven at a depth of 86 feet. The workings show that the shoot of ore worked in the Euranderie mine extends into the Mayes mine for a horizontal distance of at least 100 feet. In appearance the ore from the two mines is similar. A quantity has been raised and treated from the Mayes mine, but I am unable to give any particulars concerning the yields obtained. The outcrop of the lode has been exposed for a distance of several hundred feet in an easterly direction from the shafts.

Taylor and Mahlock's mine—*Authority No. 1, Por. 77.*—Here a lode, which may possibly be an extension of the Euranderie lode, can be seen outcropping in a series of trenches for a distance of about 2,000 feet. A shaft has been sunk to a depth of 50 feet upon the lode, and a tunnel is being driven upon it from a point where it outcrops in a gully. The lode has an average width of about 9 inches. In the Euranderie and Mayes mines very little oxidised ore has been met with, but here the zone of oxidation extends for some distance beneath the surface. Seven tons of ore have been raised and treated for a yield of 76 oz. per ton.

Felsworth mine—*Por. 15.*—The lode running through this property was first discovered and worked eighteen years ago. It is a fissure vein, and has much in common with the other lodes occurring upon the field, but differs from those worked in Bartlett's and the Euranderie mines in containing a large percentage of zinc-blende beneath the zone of oxidation. Operations have been confined to working the oxidised ores, and I was informed that no payable ore had been discovered below the 70 feet level, where the lode is almost entirely composed of argentiferous zinc-blende. A considerable quantity of oxidised ore still remains unworked.

In conclusion, I should state that recent developments have proved beyond doubt that the silver-bearing lodes of Burraborang are of a permanent character. Two extensive shoots of payable ore have been discovered, one in Bartlett's mine and the other in the Euranderie and Mayes mines. The outcrops of the lodes can be traced in the aggregate for a distance of several thousand feet, and these outcrops are all more or less silver-bearing, so it is reasonable to suppose that other shoots of ore will be discovered from time to time."

The following is a copy of a report furnished by Mr. Jaquet on a copper-lode near Cowra:—

I have the honour to inform you that I have recently inspected an important discovery of copper ore in the Cowra district.

The site is upon Crown lands in the Illunie Mountains, near J. McInerny's Bally Cully Estate, parish Bang Bang, about 17 miles in a southerly direction from Cowra.

Small pieces of copper ore have from time to time been discovered in the Illunie Mountains, which form a continuation of the Broula Range. About twelve months ago Messrs. Peel and Sheargold commenced systematic prospecting with a view of finding the deposits from which these specimens had been shed. Their efforts were rewarded by the discovery of some narrow veins, from which a few tons of ore containing from 8 to 23 per cent. of copper were raised. Six months ago a kangaroo hunter, named Newham, found by chance a rich outcrop of carbonate ore. He communicated with Messrs. Peel and Sheargold, and a syndicate was formed to prospect the deposit.

The country is felspar-porphry. The lode trends north and south, and underlays west. It is of a well-defined character—probably a fissure lode. Carbonate ore can be seen outcropping upon the surface for a distance of 90 feet, but no attempt has been made to trace the cap of the lode by trenching. However, about 20 chains south of the site of Newham's discovery, apparently upon the line of lode, rock impregnated with copper carbonates can be seen.

An underlay shaft has been sunk to a depth of 29 feet, and the lode as seen in this shaft is well defined, from 2 feet 6 inches to 3 feet wide, and composed of very rich ore. In the bottom of the shaft the ore is composed of a mixture of yellow and black sulphides. A parcel of 17 tons 10 cwt., raised from between the surface and a depth of 18 feet, and composed mainly of carbonates, was found when smelted at the Cockle Creek Smelting Works to contain 15.5 per cent. of copper. Another parcel of 5 tons 9 cwt., composed of a mixture of carbonates and sulphides, and raised from between a depth of 18 and 22 feet, was found to contain 27.1 per cent. of copper.

In my opinion this lode is of a promising character, and as the same geological formation extends over a considerable area of country it is reasonable to suppose that other lodes await discovery.

On 30th July, Mr. Jaquet, after examining the Nundle Gold-field, furnished the following report:—

I have the honour to inform you that, in accordance with your instructions, I have made an examination of the Nundle, Hanging Rock, and Bowling Alley Gold-fields.

The dominant geological formations are claystones and tuffaceous rocks of Devonian Age. Many of these rocks are more or less calcareous, and beds of limestone are interstratified with them.

Resting approximately in a horizontal position upon the upturned edges of the older rocks are extensive beds of ferruginous shale and gravel of Tertiary Age. The shale beds yield an abundant supply of plant remains.

The igneous rocks comprise masses of granite, which intrude the claystones and tuffs, and also bands of andesite, which may be either intrusive or may represent contemporaneous lava flows. The Tertiary strata are in many places capped with sheets of basalt, and these sheets form part of that extensive series of flows poured out during late Tertiary times over a large area of the New England table-land. Serpentine occurs both at Hanging Rock and Bowling Alley.

I give elsewhere an ideal section illustrating the general geology of the district.

A large quantity of gold has been won from the fields. This has been obtained from three sources:—

- (a) Reefs in the slates and tuffs.
- (b) Beds of Tertiary gravel.
- (c) Alluvial deposits of Post-Tertiary or Recent Age.

Reefs in the Slates and Tuffs.—Many of the quartz mines of the district were not being worked at the time of my inspection, and in consequence I was not able to enter the workings, and the information which I have to give under this head is somewhat meagre.

The majority of the reefs which I examined appeared to be fissure veins, and of a permanent character, but the shoots of payable gold within the reefs have generally proved to be short, and it is probably owing to this reason that the output of gold from this source has not been more regular in the past. Nevertheless, handsome profits have been made in many instances by working the reefs.

The Tamworth Gold-mining Company is exploiting two well-defined veins, which, though for the most part narrow, in some places bulge out to a width of 2 feet. From near the outcrops some very rich stone has been won. The Company is sinking a shaft upon one of the veins from the end of a crosscut tunnel. The shaft is now down 181 feet below the level of the tunnel. The manager of the mine, Mr. Bennet, informed me that during the last two years 3,000 tons have been crushed for a yield of a little under half an ounce per ton.

In Gazelee's mine, which adjoins the Tamworth mine, the same two reefs are being worked. The reefs are several feet apart at the north end of the claim, but junction towards the south. A considerable quantity of payable gold has been obtained from this mine.

At The Folly, to the north of Hanging Rock, Messrs. Jarvie and Party have followed a promising looking reef down to a depth of about 30 feet upon the underlay. Rich ore has recently been raised from this shaft, and the reef at the bottom is 1 ft. 6 in. wide.

Messrs. Whitfield and Party are sinking a winze from the floor of an old tunnel upon a promising looking vein, and have recently raised a few tons of excellent ore.

Beds of Tertiary auriferous gravel.—These beds are in part exposed upon the surface and in part covered by basalt. They cover many square miles of country, and are frequently as much as 60 or 70 feet thick. They are composed of a sandy gravel. In places they have been found to include patches of very rich ground which have been profitably exploited by tunnels, but the great bulk of the drift material is poor as regards gold contents. Several attempts have been made to exploit the drifts upon a large scale by hydraulic mining, but in no instance has the venture been financially successful.

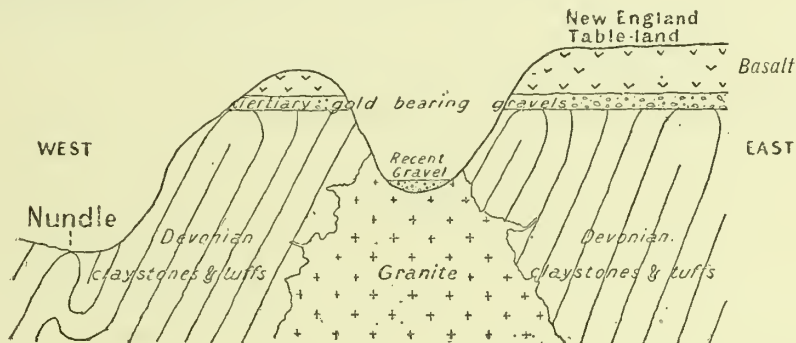
Alluvial

Alluvial deposits of Post-Tertiary or Recent Age.—These deposits are to be found in almost every gully running down from the ranges. They must in a great measure have derived their gold from the older Tertiary drifts, though some of it has undoubtedly been derived from reefs in the adjoining country. Many of these deposits have been found to be of extraordinary richness, and in former years they have yielded large supplies of gold. At the present time they provide a living for a number of fossickers.

In the Mount Ephraim Valley there occurs an extensive deposit of Post-Tertiary drift (?) which needs to be specially mentioned. The drift material (?) extends over a large area. I had not sufficient data to enable me to give an estimate of its average thickness, but in the old workings banks can be seen nearly 40 feet high. It is composed of large blocks of partially decomposed clay-stone and a small quantity of subangular quartz gravel. Some years ago a company was formed to exploit the deposit, but it does not seem to have been fairly tested, and the operations resulted in failure. Huntingdon mills were erected, and the dirt appears to have been treated like lode material, and, indeed, in many respects it resembles a great mass of impregnated country. For some time past two miners, Messrs. Swan and Sepple, have been ground-slucing the deposit. In the event of it being possible to obtain sufficient water an attempt might be made to work the ground by sluicing upon a large scale, but the clayey character of the dirt would render efficient gold-saving more difficult than would be the case with a sandy or gravelly drift.

Impregnated Country Rock Deposits.—Near "The Folly" line of reef on old miner, Mr. John Wright, has proved that the gold occurs not only in the quartz reefs but also in the country in their vicinity. Mr. Wright has erected a small stamper battery upon the creek, and is now working an extensive body of auriferous slate. He has proved the auriferous rock to be at least 25 feet wide, and to extend downwards to a depth of 50 feet, and has raised and crushed about 400 tons of ore. The ore is composed of a light-coloured decomposed slate, which is traversed in all directions by small veinlets of ferruginous quartz. The gold may possibly occur only in these veinlets, and not in the slate itself, but the fact remains that we have here an extensive low-grade deposit. I took a series of samples from the exposed faces, and these showed the ore-body to contain from 2 dwt. 17 grs. to 5 dwt. 10 grs. of gold per ton. I consider this discovery of importance. The majority of the auriferous deposits at Cobarr, which is now the most productive gold-field in the State, are somewhat similar in character. I would strongly advise prospectors in the district to test the country rock for gold, more particularly in those places where it is impregnated either with quartz or iron oxide. If this be done it is possible that bodies of low-grade auriferous slate may be discovered, from which the gold could be profitably extracted by cyanidation.

Chrome Iron Ore.—In the vicinity of Bowling Alley chrome iron ore has been discovered. It occurs, like the Gundagai ore, in pockets in the serpentine. Several years ago a parcel of a few tons was raised and sent to Sydney. I am informed that the ore comprising this parcel contained 47 per cent. of chromic oxide, but having regard to the general appearance of the ore *in situ*, I think it probable that a considerable quantity of 50 per cent. ore could be raised by judicious grading. There is an extensive belt of serpentine, and pockets of the ore are likely to be found anywhere within this belt. The margin of profit is not sufficient to permit of this ore being profitably worked at the present time when it has to be carried over 30 miles to Tamworth.



IDEAL SECTION, ILLUSTRATING THE GENERAL GEOLOGY OF THE NUNDLE AND HANGING ROCK GOLD-FIELD.

A deputation having waited upon the Minister for Mines to urge the erection of Government Smelting Works at Broken Hill, Mr. Jaquet was instructed to inspect the outlying claims of that district. The following is a copy of his report, which was furnished on the 8th August:—

I have the honor to furnish you with a report in reference to the proposed "State Smelter" for the Barrier Ranges. To provide smelting works capable of reducing both copper and silver-lead ores would necessitate an outlay of at least £10,000 or £20,000, and the annual cost of the establishment would be great, since the works could not be carried on except under the supervision of a highly paid metallurgist and staff.

For many years the ores raised from the Proprietary and other large mines were smelted locally, but it has now been found that smelting operations can be carried on more profitably upon the South Australian sea-board, and the last blast furnace was blown out several years ago.

It is proposed that the supply of ore for the State smelter should be obtained from the various small mines which are to be found at distances up to 30 miles from the town.

I will first of all say a few words in reference to the "outside" silver-lead mines. I inspected these some years ago, and am well acquainted with the majority of them. The most important is the Pinnacles Mine. Here there are wide lodes of excellent argentiferous galena, and at the present time the output is about 100 tons of ore and concentrates per fortnight. Even when smelters were in blast at Broken Hill this ore was sent away to the coast for treatment, and in so far as the railway charges per ton for conveying the ore to the coast are only 15s., it is not likely that the ore would be available in the event of a State smelter being erected. From mines at Thackaringa, and, perhaps, from some in the Appolyon Valley, small parcels of good galena ore could be obtained, but I think it doubtful if a regular supply of even 20 tons per week could be guaranteed from these sources. Elsewhere within the district there are many mines from which considerable quantities of zinciferous sulphide ore could be obtained, but such ores would require to be concentrated, and it would be necessary to erect concentrators and provide a water-supply for each mine. Moreover, it is very doubtful whether these concentrates could be profitably carted many miles to a smelter, and this certainly could not be done while the present low price of lead obtains.

One of the most important copper mines is situated at Balaclava. Here there is a belt of country about 2 miles long and, perhaps, 300 feet wide, which includes more or less disconnected masses of ironstone. Beneath the ironstone excellent copper ore has been discovered in some places. Though there are indications which point to the presence of considerable bodies of copper ore, yet a large amount of developmental work would have to be undertaken before any large and regular output could be made.

The Nadbuck Mine is situated near the Acacia siding. Here a lode, which varies in width from 1 to 3 feet, has been proved to a depth of 200 feet, and has yielded a quantity of rich ore. During the eight months ending 15th June, 1901, about £900 worth of ore has been raised from the mine.

The Hampden Mine is distant about 6 miles from Broken Hill in an easterly direction. A shoot of rich copper ore, which has an average width of 8 inches and a length of 20 feet, has been followed to a depth of 85 feet. About 33 tons of ore, containing upon the average 25 per cent. of copper, have been raised and despatched to South Australia.

The Ruby Copper Mine is situated just off the road to the Daydream, about 10 miles from Broken Hill. The shoot of payable ore is from a few inches to 1 ft. 6 in. wide and 60 feet long. A shaft has been sunk upon the lode to a depth of 120 feet. I was informed by Mr. Ruby, the owner, that 200 tons of ore have been raised and sent away for treatment. I also inspected other mines capable of yielding a few tons of rich ore.

After

After carefully considering all the circumstances, I am of opinion that public smelting works could only be carried on in Broken Hill at a loss to the State, partly because of the high price of coke, coal, water, and supplies, and partly because an adequate and regular supply could not be guaranteed as forthcoming from "the outside mines."

It has been suggested that the State should erect the works and carry them on at a loss; and it was pointed out to me in support of this contention that if the cost for reduction of silver-lead and copper ores—particularly the latter—should be reduced it would stimulate the search for these ores, and lead to the opening up of many fresh mines. This would seem to me to be tantamount to a proposal to give a bonus for every ton of ore raised; and, indeed, the loss to the State would not be so serious if this were done as would be the case if smelting works were erected, for the heavy initial outlay would be saved.

On the 12th August Mr. Geological Surveyor Jaquet furnished the following report on the Wertago Copper Field:—

I have the honour to inform you that, in accordance with your instructions, I have made an examination of the Wertago Copper-field.

The field is situated in the parish of Wertago, county Yungnulgra. It is distant in a direct line 100 miles north-east of Broken Hill, and 70 miles north-west of Wilcannia.

The occurrence of copper in the locality has long been known, and thirty years ago parcels of ore were despatched from the field, but it is only since the end of 1898 that much developmental work has been carried out and public attention directed towards the field.

The dominant geological formations are schists, quartzites, sandstones, and conglomerates of Lower Silurian (?) age. These sedimentary rocks are intruded by dykes of amphibolite and quartz-felsite. Recent deposits of amorphous limestone, similar in character to those which occur at Acacia Siding and elsewhere in the vicinity of Broken Hill, are found capping the older rocks in places.

The copper ore occurs partly in well-defined lodes, and partly as detached bunches or pockets, which are found more or less in a line with one another along certain zones of country.

The Copper Well Mine, Blocks 113 and 114.—The lode worked here is well-defined, and, as seen in the mine workings, has an average width of over 2 feet. A shaft was sunk 30 years ago in search of copper ore, and a good flow of water being met with it was utilised as a well for watering stock. The shaft is 150 feet deep. At 100 feet levels have been driven 60 feet in a south-westerly direction and 90 feet in a north-easterly direction upon the lode. Excellent carbonate ore can be seen in many places, both in the floors and backs of these levels. The lode is nearly vertical, and follows the shaft to a depth of 100 feet, when it passes out to the west. The shaft is full of water from 100 feet downwards, and I was unable to descend below this level. I was informed, however, that the shaft was deepened with a view of obtaining a further supply of water, and that no crosscut had been driven from the bottom, though, having regard to its underlay, the lode could not be more than a few feet from the shaft at the bottom. About 500 yards from the shaft in a northerly direction two veins carrying copper have been discovered. These veins are respectively 1 foot and 8 inches wide, and are separated from one another by 7 feet of country. Their outcrops can be traced for several chains upon the surface.

Two small parcels of ore have been despatched from the mine. One parcel weighing 1 ton 13 cwt. yielded 30.75 per cent. of copper, and another parcel of 1 ton 1 cwt. yielded 28.75 per cent.

Block 118.—Here a quarry 70 feet long has been opened along the side of a creek upon an ore-body from 2 to 3 feet wide, composed of schists impregnated with copper carbonates.

Big Wertago and adjoining blocks upon the western slopes of the Cootawundy Range.—We find here a belt of country—conglomerates, sandstones and quartzites—more or less impregnated with copper carbonates, and including bunches of rich ore. The belt can be traced for at least five miles, and copper ore, or country stained with copper carbonates, can be seen outcropping at intervals along its course.

Upon Block 41, one of the blocks owned by the Big Wertago Company, an open cut has been carried for a distance of 50 feet upon an ore-body which has an average width of about 4 feet, and several tons of excellent carbonate ore have been raised. Two shafts have been sunk upon this block to depths of 60 and 154 feet respectively. These shafts encountered bunches or pockets of carbonate ore. Small quarries have been opened upon ore-bodies at many other places along the belt.

Upon the blocks south of the Big Wertago Mine (Mount Wertago?) a crosscut tunnel has been carried into the hill-side a distance of 50 feet, but no extensive body of ore has been encountered.

Brady's Proprietary Mine, Block 117.—Two important lodes, trending N.E. and S.W., have been discovered upon the property. Upon the outcrop of one of these an open cut has been carried for a distance of 100 feet, and ore has been quarried for a width of from 3 to 10 feet. Ten tons of rich ore raised from this quarry have been sent away and smelted at the Wallaroo Smelting Works. A parcel of 4 tons 10 cwt. yielded 29.5 per cent. of copper, and another parcel of 4 tons 18 cwt. yielded 20.5 per cent. of copper.

The parallel lode is well defined, from 1 to 2 feet wide, and has been traced in trenches a distance of many chains. The outcrop is stained with copper carbonates in places, and from some of the trenches a few tons of excellent ore have been raised. An underlay shaft has been sunk to a depth of 40 feet upon the lode, and ore was met with all the way down.

Bunker's Hill Mine, Blocks 25 and 26.—The outcrop of the lode worked in this mine can be traced for a distance of nearly half a mile. It trends N. 30° E., and is composed of quartz which is in places stained with copper carbonates. An open-cut has been excavated along the lode for a length of 100 feet, and to a depth of 16 feet, and two parcels of ore have been raised and smelted at the Wallaroo Smelting Works. One parcel of 2 tons 7 cwt. yielded 29.5 per cent. of copper, and another of 2 tons 10 cwt. yielded 23.8 per cent. of copper. About 40 feet from the outcrop, near the open-cut, a vertical shaft has been sunk 100 feet. The bottom of the shaft is in quartz and a little copper carbonate is to be seen. The lode has but a slight underlay and the shaft does not appear to have penetrated as far as the footwall.

Bunker's Hill, Block 3.—Here the same lode is being worked as in the last-mentioned mine. A large quarry has been opened upon the outcrop, and a shaft has been sunk to a depth of 100 feet. I was unable to descend the shaft, but was informed that it passed through the lode.

Summary.—My examination of the Wertago Copper-field has made me of opinion, that it is capable of yielding considerable quantities of copper ore. There are two great obstacles which impede the progress of the mines: their isolated position, and the difficulty of obtaining an adequate and regular water supply. Only the very richest ores can be profitably carted 80 miles to the river Darling, at Wilcannia. The small parcels hitherto despatched have contained from 29 to 30 per cent. of copper. It is scarcely to be expected that the mines are capable of yielding much ore of such high grade, and for any large output we must look to methods which will enable the lower grade ores to be profitably treated.

A reverberatory furnace was erected some few months ago, and many tons of carbonate ores were reduced.

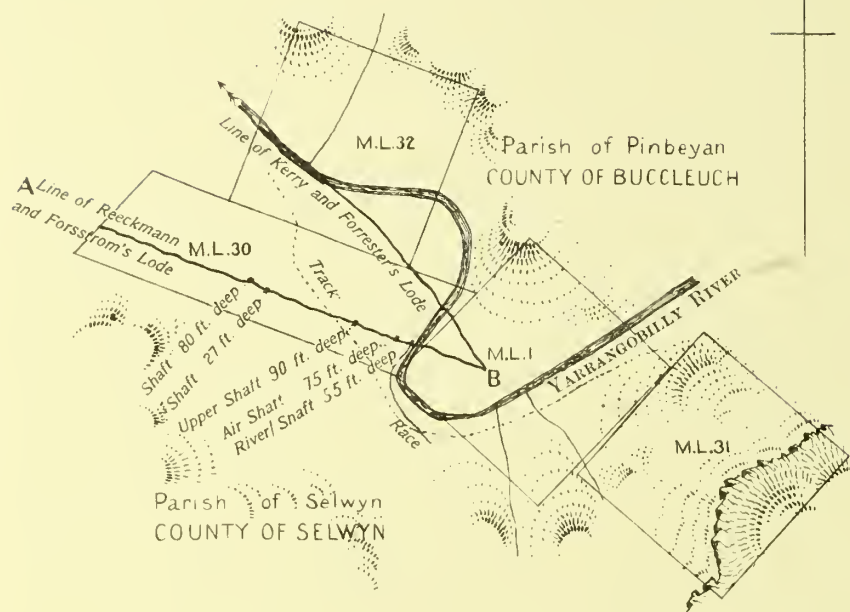
Ironstone and limestone, obtained locally, were used as fluxes, and the fuel employed was wood. Smelting operations do not appear to have progressed favourably, and the furnace has been closed down for some time past. I am informed that less than three tons of copper were produced. I am not in a position to discuss, in detail, the circumstances which caused the enterprise to fail. However, it is apparent to anyone examining the various mines upon the field, that the ores hitherto discovered are chiefly of one kind—acid (siliceous) carbonate ores. These ores could be best smelted in conjunction with basic sulphide ores, and it is probable that ores of this character will be found occurring beneath the zone of oxidation. Should it be decided to sink in search of sulphide ore, I would recommend that a site be selected upon a well defined lode, such as that occurring in the Copper Well Mine, rather than upon an impregnated belt of country where the ore is to be found in disconnected bunches, such as is the case in the Big Wertago and adjoining mines.

Much of the ore would require to be concentrated before treatment, and, it is even possible, if proper concentrators be erected, a considerable quantity of the poorer ores might be profitably concentrated, and the concentrates carted to the river at Wilcannia.

Towards the end of the year, Mr. Jaquet was instructed to commence a geological Survey of the Southern Coal-field, and he is now engaged upon this work, in which he is being assisted by Mr. L. F. Harper, field-assistant.

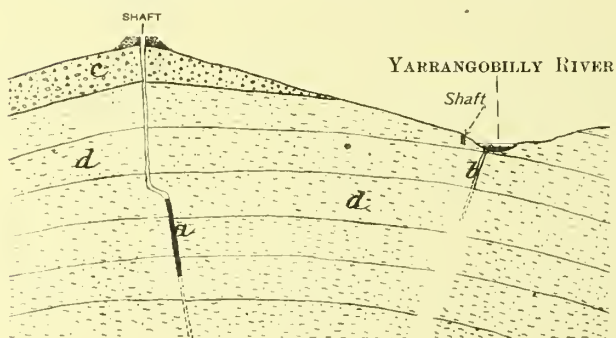
Sketch Plan of Lobbs' Hole Copper Lodes

Scale 0 10 20 Chains



Sketch Section across The Lobbs' Hole Copper Lodes

Horizontal Scale 0 4 8 Chains
Vertical Scale 0 40 80 Feet



- a* Reeckmann and Forsstrom's Lode
- b* Kerry and Forrester's Lode
- c* Breccia
- d* Siliceous variety of argillaceous Rock

Photolithographed by
W. A. Gullett, Government Printer,
Sydney, N.S.W.

It is matter of very great importance that the extent and quality of our coal resources should be defined, and I feel confident that the issue of a memoir on this subject will be hailed with satisfaction by the public.

Mr. Geological Surveyor E. C. Andrews was engaged for a considerable portion of the year in inspecting land (within gold-fields) which it was proposed by the Lands Department to alienate. He also completed his report (accompanied by a geological map) on the Yalwal Gold-field, which has just been issued as No. 9, of the Mineral Resources Series.

On the 4th February, I accompanied Mr. Andrews to Kiandra, where he remained until he had completed a geological survey of the country traversed by the Kiandra deep lead. In this work he was assisted by Mr. C. E. Murton, field-assistant. Mr. Andrew's report on this gold-field is now with the Government Printer, and there is good reason for believing that its publication will be the means of attracting capital to develop this almost neglected gold-field.

The following reports have been received from Mr. Andrews:—

THE LOBB'S HOLE COPPER LODES.

The existence of these deposits has been known for some considerable time, as will be seen from the appended extract from "The Copper-mining Industry" of New South Wales. ("Mineral Resources No. 6,") p. 130, by Mr. J. E. Carne.

"The Rev. W. B. Clarke in his 'Southern Gold Fields,' 1860, p. 108, states that on the 'western flanks of the Munniong (Snowy—J. E. C.) Range, and in the mountainous regions of Jagungal or Big Bogong and Kiandra, ores of copper abound, sulphurets and carbonates of that metal promising a profitable field of labour and enterprise. Such have been long known to exist in the great breaks of the Tumut, near Lobb's Hole.' Mining probably began at Lobb's Hole about 1874, for in that year the following parcels of ore from the deposit were treated at the English and Australian Copper Smelting Co.'s Works at Waratah:—

5 tons 16 cwt.	Yield, 26½ per cent. copper
8 " 10 "	" 26½ " "
2 " 10 "	" 26½ " "

In 1892, aid was granted to Weselman and Party to continue sinking on this lode to 160 feet, but they abandoned it after the 80-foot level was reached. Afterwards the pumping plant was removed to Storey's Reef, Paddy's River, near Tumberumba. Recently some members of the previous party re-pegged the ground, and, subsequently, it was examined by Mr. E. C. Whittell, Geological Assistant, who reported the lode to be 3 inches, with occasional bunches 12 inches thick, as proved by several shafts for about 1,130 feet horizontal and 30 to 40 feet in depth."

The ore deposits are situated in the bed and alongside of the Yarrangobilly River, distant some 12 miles from Kiandra and 10 miles from the Yarrangobilly Caves. The river at the mines lies in a great gorge exceeding 3,000 feet in depth.

The country rocks consist of quartzite breccias and siliceous argillaceous strata, overlain by conglomerates, sandstones, quartzites, limestones, and slates of the same age. Folding by great granitic intrusions is very pronounced, the strata at the mines having been forced into a dome-shaped mass, possessing an almost horizontal dip, but inclined in all directions from this spot as a centre.

The reefs are contained in true fissure veins. As their outcrops are at times in the river bed itself and always in close proximity to it, the caps are not of a gossany nature, pure sulphides occurring at the surface.

The line of reef A B (see plan), owned by Messrs. Reeckmann and Forsstrom, has been traced for some 20 chains alongside the river bank. It varies from 4 to 18 inches in width, and has an average width of 7 inches of copper pyrites. Rarely lenticular patches of ore occur as much as 3 feet in width, while at times the walls close on each other to the exclusion of the ore.

The reef has been worked by shafts and levels for a distance of 7 chains, and to a depth of 100 feet. The upper 15 feet was contained in a siliceous breccia and was non-payable. Below the breccia, in the fine-grained argillaceous rocks, the copper has been and is still very remunerative. At the 100 foot level the fissure is wide and filled with material derived from the country by the movement of the walls. Throughout this "dig" the copper occurs as veins varying from 4 to 15 inches in width. The reef looks well at this level, the copper being as abundant and of as good quality as in the upper workings, while the soft "dig" facilitates extraction.

Near the central shaft (see plan) the total underlay is 15 feet for 100 feet of sinking. The reef is almost vertical for the first 60 feet, at which point it takes a horizontal "roll" of 8 feet.

Both the 60 and the 90 feet levels have been driven through a well-pronounced reef containing copper of splendid quality. The ore between these levels is now being extracted by overhead stoping.

The reef beneath the river will be worked from the river shaft, which at present is 55 feet deep.

The power for haulage and pumping is obtained by bringing water from Wallace Creek in a race 50 feet above the river.

Lobb's Hole is awkwardly situated with respect to the outside world. Kiandra, a few miles away, is 3,000 feet above the mine, and a gorge 3,300 feet deep has to be ascended before reaching the town.

The ore is at present packed by horses up a track reaching an altitude of 2,400 feet some 2½ miles from the mine. Thence bullock teams convey the copper over rough mountains through Talbingo to Gundagai.

The cost of transport of ore to the smelting works, according to existing contracts, is as follows:—

Packing on horseback, 3 miles, per ton	£1 0 0
Bullock-teams to Railway Station ..	2 0 0
Railway charges, Gundagai to smelting works.....	0 15 3½
	£3 15 3½

The residents of the district, recognising the potentialities of the locality, are agitating for the construction of a road up the mountain leading to Tumut (Plate).

The ore is remarkably pure, assays varying from 30 to 32 per cent. of copper—theoretically pure copper pyrites containing 34·5 per cent. Cu. Most of the ore is extracted as "firsts," the remainder, with its clay admixture, being hand jigged. A great amount of finely-divided copper pyrites mixed with sand is stacked, the 10 per cent. copper it is estimated to contain not being sufficient to cover expenses of carriage and smelting.

The following results, taken from Dapto and Cockle Creek Smelting Companies' returns, supplemented by an examination of Messrs. Reeckmann and Forsstrom's books, show the value per square fathom of reef and the quality of the copper ore:—

January, 1899–December, 1899—	Value.
78½ tons copper sulphide.....	£1,631 19 0
Average value per ton	21 9 6
December, 1899–December, 1900—	
188½ tons (including 20½ tons at grass).....	3,864 3 6
Average value per ton	20 11 1

During the year December, 1900–December, 1901, a still larger amount of copper was raised of equally good quality with that of the former years. Up to date nearly £14,000 worth of copper has been raised (according to Cockle Creek, Dapto, and Waratah Smelting Companies' returns), the greater part of which has been raised during the last three years.

Till December, 1900, 182 square fathoms (measured along face of reef) had been extracted, for a yield of 332 tons of copper pyrites, averaging 1 ton 16 cwt. 54 lb. per fathom.

Kerry and Forrester's lode is as well pronounced as the main line, and contains equally good copper ore, but the vein is narrow, being 3 to 4 inches in width, and outcropping throughout the greater portion of its length in the river bed. Its underlay is to the south, whereas that of the larger lode is in a northerly direction. It has been traced along the surface for nearly 40 chains, and appears to junction with the main vein some 7 chains east of Reechmann's river shaft.

Rich patches of ore have been worked in the Yarrangobilly River bed, but the stream is too swift and possessed of too great a volume of water all the year round to admit of the sinking of shafts in the channel.

A shaft is being sunk to the south of the outcrop so as to strike the reef at a depth, and thence to drive levels beneath the river bed.

A parcel of 10 tons sent to Cockle Creek Smelting Company was paid for on an assay value of 32½ per cent. copper.

Note on the occurrence of Graphite at Wilson's Downfall, by Mr. E. C. Andrews.

Graphite deposits have been known to occur some 11 miles east of Wilson's Downfall for many years past. They occur in slates and tuffs (Carboniferous) intruded by granite. The stratified rocks are much contorted, but have a prevailing strike approximately north and south, and varying dips.

In the prospecting holes and shafts about the graphite deposits are observed to conform exactly to the dip of the surrounding rocks, and to outcrop on the surface after the fashion of coal seams. I was on the ground for a very short time only, but have little hesitation in describing the deposits as *dirty coal seams*, altered to impure graphite by intrusive granites. (It would be interesting to track the outcrop of one of the seams to a point at which the granite crosses its strike, and notice whether the graphite is cut off by the intrusive rock.)

Two companies have worked the deposits. One, managed by Mr. Smith, postmaster at Wilson's Downfall, has a shaft 50 feet deep sunk on the underlay. This shaft I was unable to descend, but in two holes prospecting the outcrop lower down the hillside the formation appeared to be as shown in diagram A.

The seam is 2 feet wide.

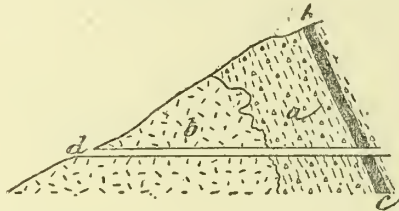
Another seam, some 10 chains to the west, has a dip of 45 or 50 in a westerly direction. A tunnel, 120 feet long, was driven in the hillside to prove the lode. This is shown in diagram B.

DIAGRAM A.



- a. Tuffs and slates. Dip westerly at 35°.
- b. Acid granite.
- c. Altered coal seam, 2 feet wide.

DIAGRAM B.



- a. Tuffs and slates.
- b. Acid granite.
- c. Graphite seam (altered coal seam). Dip 45° to 50°.
- d. Tunnel, 120 feet long

DIAGRAMS, ILLUSTRATING METHOD OF OCCURRENCE OF GRAPHITE AT WILSON'S DOWNFALL.

Report on Metalliferous Lodes at Bolivia and Pye's Creek, by Mr. Geological Surveyor Andrews.

From the 2nd to 5th December I inspected various metalliferous lodes at Bolivia and Pye's Creek (15 miles from Bolivia).

(a) Bolivia.—The country is composed of granite of two ages—a fine-grained black variety intruded by a coarse granite.

Most of the places inspected were being prospected for gold, silver, and lead. In no case here did I see anything that appeared to be worth developing.

In one instance a well-defined reef had been prospected, but it contained neither gold nor silver.

On a mountain some 6 miles west of Bolivia railway station numerous reefs and large bunches of arsenical pyrites occur, associated with very small quantities of molybdenite and wolfram. Molybdenite occurs in a quartz "blow" in granite 7 miles along the Bolivia-Pye's Creek road. About 10 tons of stone have been broken out, but the molybdenite, which occurs as large scales in the quartz, is not present in sufficient quantities (near the surface) to pay for treatment, although at the present time the mineral is in great demand, and commands a high price (10d. per lb.).

(b) Pye's Creek.—Silver-lead veins occur here in country composed of slate intruded by granite.

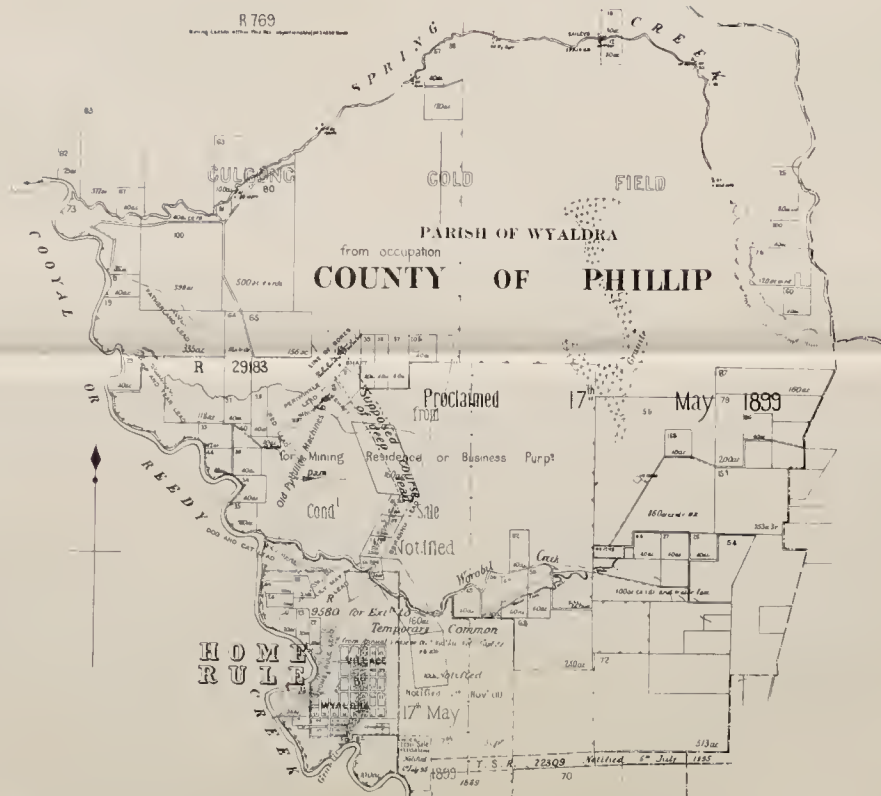
The veins occur mostly as true fissures, and contain lenticular patches of ore alternating with zones barren of metalliferous deposits. The vein material is composed mostly of arsenical pyrites and zincblende, with varying quantities of galena and silver, the latter mineral being said to be present in the proportion of 20 to 40 ounces per ton.

Messrs. Meredith's party asked specially for advice in the matter of prospecting a silver-lead lode at Cave Creek. The locality is extremely rugged. A large quartz-porphry dyke traverses a hard slate formation, and in the face of a porphyry cliff several short, narrow, and almost horizontal veins occur, containing lenticular patches of ore. The vein material is arsenical pyrites and galena, containing silver. The galena at times shows brilliantly in the cliff face. Considering the hard nature of the country, the narrow nature of the veins, the capricious distribution and complex nature of the ore, and cost of carriage, I am of opinion that Meredith's party could not work the deposits to their advantage.

MAP

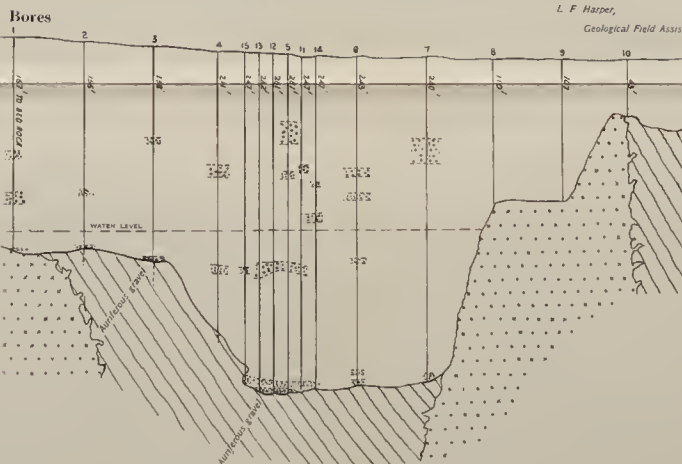
with Section
Showing result of boring for Deep Lead
at
HOME RULE

Scale 0 40 80 120 160 Chains

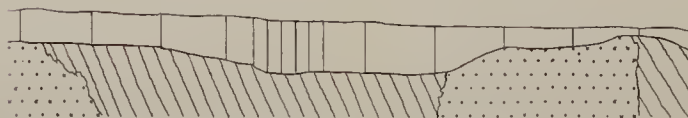


Section along line of Bores
Horizontal Scale 0 4 8 Chains
Vertical Scale 0 40 80 Feet

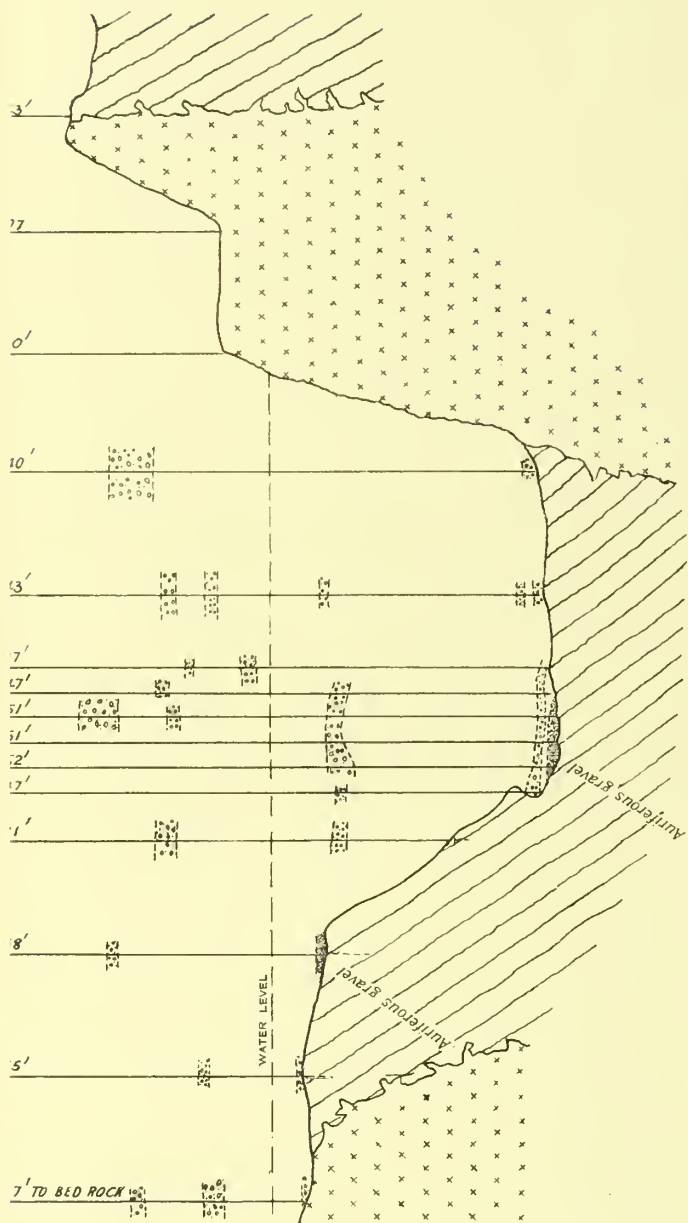
By
L. F. Harper,
Geological Field Assistant.



Same Section as above
Natural Scale



Aunferous gravel
 Gravel not auiferous
 Slate
 Granite



Same Section as above
Natural Scale

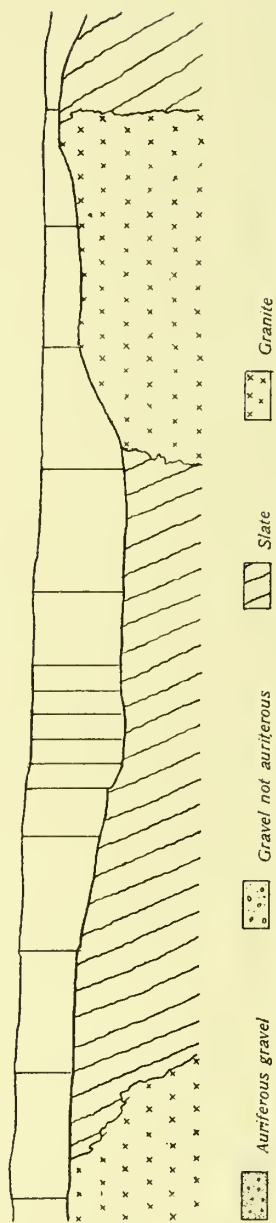


Photo-lithographed by
W. A. Gullick, Geologist, Printer,
Spring, N.S.W.

The Department having accepted a contract for putting down a line of bores to prospect for the continuation of the Home Rule Deep Lead, Mr. L. F. Harper, Field Assistant, was entrusted with the supervision of the work. On its completion he furnished the following report:—

I have the honor to submit herewith a report on certain boring operations carried out under my supervision, near Home Rule, in the parish of Wyaldra, county of Phillip, with the object of prospecting for an auriferous channel in the deep ground into which the various leads had been traced.

The accompanying map shows the positions of the various leads worked in the early days of the field, together with the line of bore-holes put down across the supposed deep channel.

As the leads were followed down into deep ground it was found that the inflow of water was too great to admit of their being economically worked, and consequently the claims were abandoned.

The Periwinkle Lead would appear to have reached the maximum depth at which it was found profitable to work the drift, at a depth of 190 feet, and as seen by the plan, this lead approaches nearer to the line of bores than any other.

In 1893, Messrs. Matthews and Bursel sank a shaft at the eastern end of this lead, the water, however, proving very troublesome. Payable wash was worked by them, averaging from 6 dwt. to 18 dwt. of gold per cubic yard, but the claim was eventually abandoned owing to the inflow of water.

A feature of the deeper ground on this lead was the thick deposit of leaves and carbonised wood which occurs near the bottom. In some cases the gold was found in actual association therewith.

Coming further south from the line of bores, the Red Lead is the next ground worked. The depth at the lower end here reached 180 feet, and the water again proved the obstacle. The gold in this lead was very patchy, but is stated to have averaged about 6 dwt. per cubic yard.

The Dog and Cat Lead was first worked in 1873, and yielded from 5 dwt. to 19 dwt. of gold per cubic yard, but water again proved too strong to work the deep ground. Lloyd and Party are still working the shallow ground, 60 feet sinking, at the western end of the lead, for an average yield of 3 dwt. 12 grs. per cubic yard.

The Britannia Lead, situated east of the former, would appear to have worked deeper ground, viz., 204 feet, but the yield was poorer, averaging about 1 dwt. 12 grs. per cubic yard. Water again proved a great difficulty.

The Lilly May Lead is situated south of the Dog and Cat Lead, and the sinking was about 130 feet and the yield variable, being from 1 oz. to 1 dwt. 12 grs. per cubic yard. No water was struck on this lead.

A shaft was sunk on what was known as the Davy Buchanan Lead, situated to the east of Home Rule, but did not bottom, after sinking 222 feet. The water proved too strong for appliances available, and work was abandoned.

The Home Rule Lead itself was discovered in 1872, and worked up to 1894. The yield averaged at the southern end about 2 oz. per cubic yard, and the sinking about 100 feet; whilst at the northern end the sinking was 192 feet, and the yield about 8 dwt. per cubic yard. A 72-oz. nugget was found in No. 2 Stott's Paddock, on this lead. The water at the northern end of this lead proved very heavy.

The Fatherland Lead and the Rip and Tear Lead, both situated to the north-west of, or lower down the channel, than the line of bores, both proved unpayable.

It was with the object of locating the deep channel that the boring was carried out, but gold was only found in four (4) of the bore-holes, and appended are particulars of their depths and the character of the beds passed through.

No. 3 bore yielded one (1) colour of gold, and probably bottomed on a small lead formed by a shelf of slate existing immediately above the deeper ground.

No. 5 bore bottomed on a deep lead, and yielded twenty-eight (28) colours of gold, equal to 1 dwt. per cubic yard.

With a view of further testing the deep lead five bores were put down in the immediate vicinity of No. 5, two on the south-west side and three on the north-east, at distances of 1 chain apart.

No. 11 bore, situated 1 chain to the westward of No. 5, failed to bottom on the lead; but No. 12 bore, 1 chain to the eastward of No. 5, bottomed on the lead at the same depth as No. 5, but only yielded two colours of gold. No. 13, also on the east side, yielded two colours of gold, but 14 and 15 failed to bottom on the gutter.

The fact of true bottom being reached was always insured by continuing boring for some feet into the hard rock.

The fact that the lead, as proved by the bores, is at that spot unpayable, may be taken for granted in view of the information revealed.

It will be seen from the section that the walls of the lead here consist of granite, and the unpayable nature of leads between similar walls throughout the district has been proved. The fact that neither of the two leads worked to the north-west, or below the line of bores, proved payable also points to the fact that the deep ground in this locality might prove unpayable.

It would seem to be more likely, however, that the ground higher up the lead, or in a south-easterly direction, should prove richer, as the deep ground would probably be enriched as low down as the Periwinkle Lead.

The flow of water disclosed in the bore-holes did not appear to be excessive. It was struck at a depth of about 130 feet from the surface.

DETAILS OF BORES.

Borehole No. 3.				Borehole No. 5.			
Surface to	24 feet	...	Sandy clay.	Surface to	20 feet	...	Sandy clay.
24 ft. "	34 "	...	Sand, with a few pebbles.	20 ft. "	22 "	...	Sand.
34 "	48 "	...	Sandy clay.	22 "	27 "	...	Sandy clay.
48 "	52 "	...	Fine sand.	27 "	38 "	...	Sand.
52 "	68 "	...	Coarse sand.	38 "	40 "	...	Ferruginous sand.
68 "	69 "	...	Clayey gravel.	40 "	50 "	...	Sandy clay.
69 "	70 "	...	Sandy gravel.	50 "	66 "	...	Sandy gravel.
70 "	76 "	...	Sand.	66 "	67 "	...	Sandy clay.
76 "	77 "	...	Clay, with a little sand.	67 "	73 "	...	Clay, with a little sand.
77 "	83 "	...	Sand.	73 "	87 "	...	Sand.
83 "	84 "	...	Yellow clay.	87 "	91 "	...	Sandy clay, with a few pebbles.
84 "	94 "	...	Sand.	91 "	154 "	...	Fine sand.
94 "	102 "	...	Sandy clay.	154 "	160 "	...	Sandy gravel.
102 "	108 "	...	Fine sand.	160 "	161 "	...	Clay.
108 "	114 "	...	Coarse sand, with a few pebbles.	161 "	178 "	...	Clay, with a few thin bands of carbonaceous material.
114 "	115 "	...	Clay.	178 "	180 "	...	Sand, with a little carbonaceous material.
115 "	116 "	...	Sand.	180 "	185 "	...	Clay.
116 "	118 "	...	Clay.	185 "	207 "	...	Sand.
118 "	119 "	...	Sandy clay.	207 "	235 "	...	Carbonaceous clay.
119 "	120 "	...	Sand, with a few pebbles.	235 "	242 "	...	Sand.
120 "	131 "	...	Sand.	242 "	246 "	...	Gravel.
131 "	135 "	...	Clay.	246 "	248 "	...	Sand.
135 "	136 "	...	Sandy clay.	248 "	251 "	...	Gravel (wash).
136 "	136 ft. 6 in.	...	Clayey gravel.	251 "	260 "	6 in.	Red-rock (slightly pyritous clay-slate).
136 ft. 6 in. to	153 "	...	Sand.				
* 153 ft. to	158 "	...	Gravel (wash).				
158 "	161 "	6 in.	Clay.				
161 ft. 6 in. to	180 "	...	Clay-slate (bed-rock).				

* The core from this gravel-bed yielded one colour of gold.

The core from this gravel yielded twenty-eight colours of gold.

Borehole No. 12.				Borehole No. 13.			
Surface to	10 ft.	...	Cemented sand.	Surface to	2 ft.	...	Sand.
10 ft. "	23 "	...	Sandy clay.	2 ft. "	17 "	...	Cemented sand.
23 " "	26 "	...	Clay.	17 " "	20 "	...	Sand.
26 " "	30 "	...	Sandy clay.	20 " "	26 "	...	Sandy clay.
30 " "	32 "	...	Clay.	26 " "	27 "	...	Clay.
32 " "	46 "	...	Sandy clay.	27 " "	34 "	...	Sandy clay.
46 " "	56 "	...	Clay.	34 " "	38 "	...	Sand.
56 " "	64 "	...	Sandy clay.	38 " "	49 "	...	Sandy clay.
64 " "	77 "	...	Clay.	49 " "	50 "	...	Cemented sand.
77 " "	82 "	...	Sand.	50 " "	72 "	...	Clay.
82 " "	88 "	...	Gravel.	72 " "	79 "	...	Sandy clay.
88 " "	103 "	6 in.	Sand.	79 " "	107 "	...	Sand.
103 " 6 in.	104 "	...	Sandy clay.	107 " "	112 "	...	Clay.
104 " "	160 "	...	Sand.	112 " "	117 "	...	Sand.
160 " "	163 "	...	Gravel.	117 " "	120 "	...	Clay.
163 " "	182 "	...	Clay.	120 " "	137 "	...	Sand.
182 " "	183 "	...	Carbonaceous clay.	137 " "	138 "	...	Clay.
183 " "	191 "	...	Sand.	138 " "	156 "	...	Sand.
191 " "	236 "	...	Carbonaceous clay.	+156 " "	167 "	...	Gravel
236 " "	239 "	...	Sand.	167 " "	170 "	...	Sand.
239 " "	242 "	...	Carbonaceous clay.	170 " "	179 "	...	Clay.
242 " "	245 "	...	Gravel.	179 " "	180 "	...	Sand.
245 " "	246 "	...	Very carbonaceous clay.	180 " "	189 "	...	Carbonaceous clay.
*246 " "	251 "	...	Gravel (wash).	189 " "	204 "	...	Sand.
251 " "	255 "	11 in.	Bed-rock (slightly pyritous clay-slate).	204 " "	239 "	...	Carbonaceous clay.
				239 " "	240 "	...	Sand.
				240 " "	243 "	...	Carbonaceous mud.
				+243 " "	246 "	6 in.	Gravel.
				246 " 6 in.	248 "	...	Sand.
				+248 " "	252 "	...	Cemented wash.
				252 " "	256 "	7 in.	Bed-rock (slightly pyritous clay-shale)

* The core from this gravel yielded two colours of gold.

† Gold was not found present in this gravel.

‡ The core from this gravel-bed yielded one colour of gold.

Mr. J. C. H. Mingaye, Analyst and Assayer, reports as follows respecting the work performed in the Chemical Laboratory during the year 1901:—

3,733 numbered samples were received for analysis, assay and examination. 269 complete, proximate, partial and qualitative analyses were furnished. The following assays have been made for various metals, &c. :—

Antimony	2	Mercury	7
Arsenic	4	Nickel	3
Alumina	4	Platinum	7
Bismuth	26	Phosphoric Acid.....	17
Barium.....	1	Silica	21
Chrome	25	Tin	91
Copper	403	Tellurium	2
Cobalt	6	Titanic Acid	8
Iron	60	Zinc	16
Lead	90	Miscellaneous.....	17
Manganese	20	Gold and silver	3314

Or a total of 4,147 assays.

The analyses are made up as follows:—25 complete analyses; 201 proximate analyses; 23 partial analyses, and 20 miscellaneous analyses.

The following analyses were made of waters:—

(1) Water from Quambone Artesian Bore.	(3) Water from Kangaroo Valley.
(2) " " " "	(4) " " Lemon Grove, near Warren.

Eleven complete rock analyses have been furnished. These analyses, being rather complicated, have taken up much time, and entailed a large amount of careful work, in order to perform them.

In conjunction with my colleagues, Mr. Geo. Carl and Mr. H. P. White, a paper was furnished for the Geological Survey Records on "The Composition of the Bondi and Canterbury Basalts."

A large number of proximate analyses of samples of Boghead mineral were made for Mr. Geological Surveyor Carne, in connection with the examination of the oil-bearing shales of this State.

Several samples of fireclay were tested, as to their refractory properties, for the manufacture of fire bricks, etc., and in most cases analyses of the clays were furnished.

Particulars of most of the analyses and assays made during the year will be found as an appendix; but, as several are interesting, they are given here:—

No. 2160—Montanite from Nanima Bismuth Mine, near Yass.

Chemical Composition.

Bismuth (Bi)	57.73	Lime (CaO)	trace
Tellurium (Te)	19.15	Insoluble matter	2.52
Selenium (Se).....	trace	Carbon dioxide (CO ₂)	1.05
Iron (Fe) .....	.40	Water	1.61
Copper (Cu) .....	.24	Oxygen (by diff.)	15.44
Manganese (Mn)	1.78		
Magnesia (MgO) .....	.03		100.00

Mineral massive. Sp. gravity (mean of several determinations)—6.823. Partially soluble in hydrochloric acid, evolving chlorine—the manganese present being as Manganese Dioxide (MnO₂).

A few small specks of a steel-grey foliated mineral were observed in the various pieces, which were found to be Tetradyomite.

The absence of gold, silver, sulphur, and sulphur trioxide proved.

I drew the attention of the Department to the occurrence of coal in the sandstone cliffs at La Perouse, near Botany. The coal appears to occur in small pipes, or patches, and it was first pointed out to me by Mr. Howe, of La Perouse. The analyses yielded as follows:—

Proximate Analysis.	
Hygroscopic moisture	4.06
Volatile hydrocarbons	30.13
Fixed carbon	61.85
Ash	3.96

100.00

Yielded an excellent description of coke. Ash—grey in colour, flocculent.

A

A sample of Lignite from Botany has since been received :—

<i>Proximate Analysis.</i>	
Hydroscopic moisture	13·65
Volatile hydrocarbons	29·15
Fixed carbon	55·00
Ash	2·20
<hr/>	
No coke formed. Ash—yellow tinge, flocculent.	100·00

The following complete analyses of rocks have been furnished :—

ANALYSES OF ROCKS, &c.

	A. 1039· 01·	B. 1040· 01·	C. 1036· 01·	D.	E.	F.	G. 1728· 01·	H. 3361· 01·	I. 1725· 01·	J. 3638· 01·	K. 3637· 01·
Moisture at 100° C.	·19	·18	..	·29	·31	·30	·22	·22	·34	·14	·58
Water over 100° C.	1·46	·97	·66	2·67	2·69	2·31	1·21	2·44	2·16	1·34	2·71
Silica (Si O ₂)	48·10	55·74	45·92	43·39	43·48	41·10	46·51	53·62	41·62	42·48	38·12
Alumina (Al ₂ O ₃)	13·60	13·24	12·03	16·67	16·53	14·82	15·27	23·98	15·49	14·70	14·11
Ferrie Oxide (Fe ₂ O ₃)	2·50	4·10	2·24	3·47	3·42	2·35	2·50	2·62	3·41	3·96	3·58
Ferrous Oxide (Fe O)	9·81	6·44	1·73	8·50	8·91	10·38	8·92	·72	9·38	9·24	7·43
Manganous Oxide (Mn O)	·11	·07	trace	·19	·15	·14	·05	·05	·08	·11	·18
Nickel Oxide (NiO) .....	..	..	..	} traces	} traces	} traces	·03	absent	·03 {	·06 minute trace	{ absent
Cobalt Oxide (Co O) .....	..	..	..					
Copper Oxide (Cu O) .....	..	..	..	..	..	..	minute trace	..	..	·01	..
Chromium Sesquioxide (Cr ₂ O ₃) .....	..	..	..	trace	trace	trace	·02	absent	trace	·01	·01
Lime (CuO)	3·69	2·63	22·73	8·79	8·88	10·56	9·12	·68	9·74	9·98	11·40
Magnesia (MgO)	7·45	6·86	13·30	7·30	7·12	9·43	8·40	·42	10·47	9·15	6·91
Barium Oxide (BaO) .....	..	..	..	·02	·02	·06	·04	..	·22	·12	·07
Strontium Oxide (SrO) .....	..	..	..	trace	trace	trace	trace	trace	trace	trace	trace
Potash (K ₂ O)	1·79	·15	·32	2·17	2·31	1·28	1·17	5·22	1·86	1·99	1·16
Soda (Na ₂ O)	4·60	7·47	1·19	3·30	3·27	3·94	3·12	10·40	2·68	3·13	2·23
Lithia (Li ₂ O) .....	..	..	..	present	present	present	present	absent	absent	present	absent
Phosphoric Acid P ₂ O ₅)	·19	trace	..	·41	·44	·19	·33	·03	·23	·39	·40
Sulphur Trioxide S O ₃) ...	·08	trace	..	·19	·21	·09	·11	·05	·09	·10	·24
Titanic Acid (TiO ₂)	1·16	2·01	trace	2·20	2·35	3·20	2·20	·08	1·88	2·38	1·12
Vanadium Pentoxide (V ₂ O ₅) .....	..	..	trace	·01	·01	trace	·03	absent	·02	·02	·02
Chlorine (Cl) .....	..	..	..	·02	·03	trace	·04	·19	·02	·02	trace
Carbon Dioxide (C O ₂) .....	..	..	·39	·39	·40	·26	·61	·07	·56	·94	9·60
	99·73	99·86	100·51	100·28	100·53	100·50	99·90	99·79	100·28	100·27	99·87
					Less Oxygen equiv. for Cl...			·04 99·75			

A. and B.—Glaucophane Schists.

C.—Pyroxene Crystals.

D. and E.—Complete analysis of basalt from Bondi. Sp. gravity :—2·943–2·941.

F.— " " " " Canterbury. Sp. gravity :—2·994.

G.— " " Olivine Dolerite from Camden Park. Sp. gravity :—3·014.

H.—Nepheline-bearing rock, from near Lue. Sp. gravity :—2·577.

I.—Olivine Basalt, from Seal Bay.

J.— " " " " Hurstville. Sp. gravity :—3·027.

K.—Amygdaloidal Diabase, from Guildford. Sp. gravity :—2·963.

A report was furnished to the Chief Inspector of Mines as to the probable cause of a wire rope breaking at the La Carbine Mine, Forest Reefs. I have received three subpoenas to attend Court and give evidence in mining cases.

Owing to the resignation of Mr. Case, Junior Assayer, Mr. Gurney, after a theoretical and practical examination, was appointed to the vacant position.

The Mineralogist and Curator, Mr. G. W. Card, reports as follows in regard to the work done during the twelve months ending 31st December, 1901 :—

Information given to the Public.—There has again been a falling off in the number of mineral specimens submitted for examination. Of these, 3,738 were sent to the chemical laboratory to be assayed for two or more metals—a smaller number than in any year since 1893. A selection from these results will be found in the Appendix, *vide* page 178.

Gold.—No particularly noteworthy results have been forthcoming.

Silver.—As in the previous year, prospecting in the Upper Burragorang Valley has been very active, and some rich silver-lead ores have been discovered.

Copper.—With the exception of the Wilcannia and Wertago Districts, nothing need be recorded.

Tin.

Tin.—The discovery of the Buddigower field in the Wyalong District is of interest. The ore is to some extent arsenical. Some of the tin stone is of rather unusual character, possessing lower specific gravity and hardness than the mineral generally does. It is of great purity.

The drop in the value of tungsten ores to a more normal figure from the high prices prevailing last year has led to a cessation of prospecting for them. There has been some inquiry as to arsenic ores and a very little for those of zinc, but no valuable finds have been recorded.

Efforts, said to be successful, have been made to concentrate chrome-iron ores up to market requirements by mechanical processes.

A few clays and building-stones were submitted for report as to their practical value.

The number of letters written from this office giving information to the public has been 2,956.

THE MUSEUM.

Twelve collections of geological specimens have been made during the year. A list of these and of the donations received by the Museum is given in Appendices, and 597 new specimens have been registered, of which the following are of special interest:—

Silver ores from the Burragorang field.

Phosphates from the Pacific Islands Company.

Cyanite from the Ahna Claim, near Broken Hill.

Tinstone from Buddigower.

Opals from Ballina, occurring as amygdulæ in basalt.

Chrysocolla pseudomorphous after azurite from Chillagoe.

Chiasolite from South Australia.

Quartz from Kingsgate. An exceptionally fine doubly-terminated crystal.

Glaciated pebbles from Mount Kosciusko and South Australia, representing respectively a comparatively recent and an early Palæozoic Glaciation.

Four sets of drawers, forming a solid support for as many show-cases, have been made by the carpenter. They are of great utility for accommodating specimens that cannot be placed in the show-cases. A feature of the year's work has been the arrangement of a case of iron ores illustrating Mr. Jaquet's monograph on the deposits of New South Wales. Each sample has been carefully selected and labelled, and the exhibit is a most complete and important one.

I would again desire to draw attention, with all respect, but with the utmost insistence permissible, to the grave condition of the Museum building. Repeatedly has the danger of loss from fire, water, and dirt been referred to. The piles are steadily settling down, and the iron roof is developing more and more leaks. The effect on the health and working capacity of officers working there of the terrific heat on a sultry day, and of the unsatisfactory sanitary arrangements, is most serious. Moreover, the water-pipes are so corroded that only a feeble trickle can be maintained. The need of a geological and mining museum, housed in an independent building, with suitable workrooms and offices attached, is very great, and continued postponement can only result in the total loss of a collection invaluable to the mining community, and of years of work on the part of the officers of the Survey. The collection of large framed photographs has been largely added to. The general collection of geological photographs, however, grows but slowly. This is much to be regretted; the value of the photographic records is now fully recognised abroad, and great efforts are made to collect them. Much progress has been made in the substitution of printed for written labels.

Mineralogical and Petrological Work.—The easing off of the routine work of the branch has enabled me to devote myself more to this work than in previous years. Three hundred and forty-three rock specimens have been registered, and one or more micro-slides have been prepared of 170 of these. Two hundred and seventy thin sections have been made during the year. The recognition of nepheline-basalts at The Peak, Upper Burragorang, Capertee, and elsewhere of analcite-basalt near Sydney, and of a peculiar group of nepheline-agerine rocks near Luc, have been of special interest. The taking of samples during the sinking of the Balmain Colliery has been continued during the year by the aid and courtesy of the manager. The material raised during the sinking of the shaft has been carefully watched by Mr. Stone, who has obtained many valuable and useful specimens. Among other important additions may be mentioned collections of igneous rock from Kiandra and Capertee, made by Geological Surveyors Andrews and Carne respectively. Every effort is made to secure the fullest possible definition of the locality and position from which the specimens are taken. Much of the older portion of the rock-collection is, unfortunately, practically valueless, owing to the vague statements of localities.

During the year I have contributed three papers to the Geological Survey Records, and another written in conjunction with two of my colleagues. A report has also been furnished on the grey granite of Gadara (Tumut District).

Mr. Card furnished the following Report on Granite from Gadara:—

I have examined a piece of schistose granite from Gadara with regard to its capacities as a building stone, with results as follows:—

The rock submitted is from the surface outcrop, and has been detached by hammering, for both of which reasons practical tests would not give representative results.

It has not, therefore, been thought desirable to obtain any numerical results, and in all probability such determinations are better delayed until a quarry has been properly opened up. The rock may be described as a schistose granite.

Colour and Markings.—Gray, inclined to dark, the prevailing appearance being due to the effect of black mica contrasting with opaque white felspar. The markings are uniform in distribution and in size, and the appearance is a pleasing one. In consequence of the tendency to a schistose structure due to a parallel arrangement of the mica, the rock is streaky in one direction.

Owing to the presence of imperfectly oxidised iron-bearing minerals, it is possible that the effects of weathering will produce brown discoloration patches in course of time; on a polished surface, however, these might be removed as soon as formed by rain.

Polish, &c.—A 2-inch cube was chipped and polished on one face by the lapidary (Mr. W. H. Gilding), who reports that the stone "copes" well under the chisel, splitting readily with flat surfaces. The tendency to schistosity already referred to will render the stone more easy to work in one direction than in others. A good polish is received, a special feature being that the mica does not drop out and produce an unsightly pitting, as is so commonly the case. In addition to the black mica and opaque white felspar already referred to, a portion of the felspar is tawny and translucent when polished, the effect produced being very pleasing.

Constitution.—The rock is of igneous origin, and consists of an interlocking aggregate of quartz, felspar, and mica (biotite). In consequence of pressure within the earth's crust, the quartz crystals have been crushed into a mosaic-like aggregate of interlocking granules on the borders.

The crushing effects can only be detected under the microscope; they do not affect the other constituents to any appreciable extent, and are not at all likely to prejudicially influence the strength of the stone; indeed, in some respects, this may be enhanced.

Quartz.—Extremely hard.

Felspar.—Both potash and soda varieties are present. In strength, quite equal to or even superior to quartz. Decomposition products have been developed to some extent, which would somewhat assist the disintegration of the rock, but the total effect would be very slight.

Mica (Biotite).—A black variety—biotite—present in considerable quantity. This mineral imparts to the stone its characteristic appearance. By reason of its cleavability this mineral tends to assist disintegration, but inasmuch as it occurs in small uniformly distributed flakes, the effect will not be nearly so great as when large masses are present, as is frequently the case with granite; all these minerals offer great resistance to the action of corrosive acid vapors. Other minerals present in small quantities are sphene, apatite, epidote and iron ores. The three former of these will in nowise affect the value of the rock, but the possible result of the oxidation of the iron ores has already been referred to.

Strength.

Strength.—As before mentioned, it has not been considered advisable to make numerical determinations. From the mineralogical constitution and microscopic characters of the rock it may be expected to possess :—

- (a). Great crushing strength.
- (b). Great power of resisting abrasion.
- (c). Very little tendency to absorb water, and, in consequence, to resist well the disintegrating effects of freezing.
- (d). To resist changes of temperature well.

In all these points granites as a class surpass all other rocks in general use, and the Gadara rock appears to be a good sample of the class.

The weight per cubic foot is about 167 lb.

Should the quarry be eventually opened up, it will be advisable to make a series of experiments on the crushing strength, with special reference to the schistosity shown by the rock. The samples should be carefully procured—not hammered or blasted out with violence; and a series of cubes sawn (not chiselled), and tested in various directions."

Mr. W. S. Dun, Palaeontologist and Librarian, reports as follows :—

Publications.—The *Mineral Resources of N.S. Wales* by yourself has been issued, as well as *Geology, Memoir No. 2*, on the Iron-ore Deposits of N.S. Wales; *Mineral Resources*, Nos. 9 and 10, a guide to the mineral collection in the Museum; and *Records*, Vol. VII, pt. 2, are now going through the press.

MISCELLANEOUS DETERMINATION.

A collection of Upper Silurian fossils from Lobb's Hole, made by Mr. E. C. Andrews, Geological Surveyor, was examined, and found to contain—*Spirifera yassensis*, De Kon., *S. multiplicatus*, De Kon., *Pentamerus Knightii*, Sby., *Rhynchonella (Uncinulus) Wilsoni*, Sby., *Chonetes striatella*, Dalm., *Modiomorpha* (?), *Amplexus* (?), and *Orthoceras*.

From Mt. Pleasant, near Taree, Mr. C. E. Fraser collected the following Carboniferous fossils :—*Reticularia*, *Spirifera striata*, *Orthothetes crenistria*, *Athyris*, *Orthis* (?), *Productus* and *Fenestella*.

During the past year considerable time was devoted to a careful examination of the N.S. Wales Carboniferous Brachiopoda, and more particularly of those from the Clarence Town District. Notes on this fauna—"Carboniferous Brachiopoda from Clarence Town, N.S. Wales," *Records*, VII., pt. 2, pp. 72-88, pls. 21-23 (now going through press)—have been published, and show the forms present to comprise :—

Leptana rhomboidalis, var. *analoga*, Phill.

Productus pustulosus, Phill.

" *semireticulatus*, Martin.

Strophalosia, sp. ind.

Orthis (Schizophoria) resupinata, Martin.

" (*Rhipidomella*) *Australis*, McCoy.

Orthothetes crenistria, Phill.

Dielasma sacculus, var. *hastata*, Sby (?).

Dielasma, sp. ind.

Rhynchonella pleurodon, Phill.

Spirifera striata, Martin.

" *pinguis*, Sby.

Reticularia lineata, Martin.

Syringothyris exsuperans, De Kon.

Spiriferina cristata, Schloth.

Athyris (Actinoconchus) planosulcata, Phill.

I have also prepared descriptions of new forms of *Productus* and *Chonetes* (*Productus Barringtonensis* and *Chonetes aspinosa*) from the Carboniferous; these are published in the same number of "Records" :—

"Notes on some large chonetine shells from the Carboniferous of New South Wales," pp. 69-71, pls. 19, 20.

"Description of a new species of *Productus* from the carboniferous system of New South Wales," pp. 91-93, pl. 25.

A continuation of the "Australian Geological Record" for the years 1898-1901 has been prepared, and also descriptions of some Upper Silurian brachiopods. These will be published during the current year.

In conjunction with Mr. R. Etheridge, junr., considerable time has been devoted to a "Memoir on the Cretaceous Invertebrata of New South Wales." The manuscript of this is almost complete, and it will be published during this year. The same remarks apply to the "Memoir on the Plants of the Narrabeen Shales." This was commenced some years ago, but owing to the prospects of obtaining additional material during the sinking of the Sydney Harbour Colliery's shaft at Balmain, it was considered advisable to suspend publication. During the operations of shaft sinking some good material was obtained, especially of *Schizoneura australis*, Eth. fil., some specimens of which show the fructification. The species is also associated with *Glossopteris*.

Considerable progress has been made in the preparation of a guide to the Palaeontological Collection in our Museum, the Lists of New South Wales Fossils, and of types now being ready.

Specimens of kerosene shale have been sent to Professor Bertrand, of Lille, for microscopical examination.

Mr. A. Smith Woodward has also kindly consented to describe a further consignment of fossil fish from Lithgow, Goodra Vale, Talbragar, &c. A paper by Mr. Woodward on new species of *Atherstonia* and *Ctenolates* from New South Wales is contained in "Records," vii, pt. 2.

Mr. T. S. Hall, M.A., of Melbourne University, has made a detailed examination of our collection of Ordovician Graptolites; and Mr. Henry Deane, M.A., has prepared descriptions of Tertiary leaves from Wingello and Bungonia. The results of these gentlemen's work is contained in the forthcoming number of "Records."

LIBRARY.

I have to report that the Library has made most substantial and satisfactory progress during the past year. By exchange the Department has received 1,885 volumes and parts of serials and society's publications, and over 700 geological maps. Sixty-eight volumes and 207 parts of serial publications have been purchased. The gaps in many of our sets have been filled up, and every effort has been made to make our set of current geological literature as complete as possible.

The following Institutions and Societies have been added to the exchange list during the current year :—

Geological survey of Louisiana.

" " Egypt, Cairo.

" " Wyoming, Laramie.

" " Washington, Seattle.

" Department, Mysore.

Mining Commissioner, Johannesburg.

School of Mining, Kingston, Ont.

University of Pennsylvania.

Wagner Free Institute of Science.

Brooklyn Institute of Art and Science.

Mining and Metallurgy, New York.

Mining Reporter, Denver.

Mines and Minerals, Scranton.

Academia Nacional de Ciencias, Cordoba.

Kaukasischen Museum, Tiflis.

Justus Perthes Geographisches Anstalt, Gotha.

Naturforschender Gesellschaft, Dorpat.

Naturwissenschaftlichen Gesellschaft, Chemnitz.

Sevcenks Gesellschaft der Wissenschaften, Lemberg.

Ottawa Literary and Scientific Society.

Musée d'Histoire Naturelle, Brussel.

National Academy of Science, Washington.

Société de Physique and d'Histoire Naturelle, Geneva.

Norges Geologiske Undersølgelse, Christiania.

American Statistical Association, Boston.

Iowa State College, Department of Geology and

Mining Engineering, Ames.

Cotteswood Naturalists' Field Club.

During the year the following publications were distributed :—

Mineral Resources of New South Wales.

Geology, Memoir No. 2.

Annual Report for 1900.

The registration and slip catalogue have been kept up to date, and about 100 volumes have been bound.

Appended is a list of the periodicals received by the Library.

Mr.

Mr. Oliver Trickett, whose duties include the supervision of the limestone caves as well as the preparation of the geological maps and sections illustrating the Geological Surveyors' work, reports as follows :—

During the year new buildings for the accommodation of visitors have been erected at Wombeyan and Yarrangobilly, and substantial progress has been made in adding to the conveniences for visitors to the several caves.

Fifteen hundred pounds was voted for expenditure on caves for the financial year 1900-1901. The sum of £1,516 6s. 2d. was expended.

The following is a summary of the works carried out for the convenience of visitors. Included in this summary are other items of interest.

ABERCROMBIE CAVES.

A temporary caretaker was appointed for four weeks at 25s. per week during the absence of the caretaker on leave and assistant guides were employed when the attendance was large for seven days at 6s. per day.

Repairs of damage by flood, some additions to protective railings to the dancing platform, and to the smithy were effected.

The caretaker reports that rabbits are increasing and becoming a nuisance. He was authorised to wire-net the garden fence. It is to be noted with regret that the rabbits have already driven out the rock wallabies from the limestone rocks, where they formed a very attractive feature.

The Public Works Department are about to construct a road from the main Trunkey-Tuena road to the caves (M 01/22,464). This work, when finished, will be a great boon to the residents of the district.

BENDITHERA CAVES.

These caves are seldom visited owing to their position. No improvements have been made in them during the year.

BUNGONIA CAVES.

An acting caretaker was appointed for two weeks, during the caretaker's leave, at £1 per week.

A new chamber in the main cave has been opened for inspection at a cost of £S 19s. 2d. (M 01/8,651).

JENOLAN CAVES.

Steps have been taken to bring the Jenolan Reserve under the provisions of the Public Trusts Act (M 01/21,812). [Gazetted 18th January, 1902.]

The caves were visited during the year by the Hon. the Minister for Mines, who directed that some much needed improvements should be effected. These are now being made.

Extensive repairs and extensions have been made in connection with the electric lighting of the caves, at a cost, so far, of £430.

An additional supply of fish has been liberated in the Jenolan River. The following are particulars to date :—

75 Yearling Rainbow Trout,	liberated June, 1899.
750 Fry	" " " " October, 1899.
30 Yearling	" " " " September, 1899.
500 Fry	" " " " " 1899.
30 Yearling	" " " " " 1901.
400 Fry	" " " " " 1901.
800 Fry Salmon	" " " " " October, 1901.

It is pleasing to know that the fish are thriving and may be expected shortly to afford abundant sport. Steps have been taken to protect them by withdrawing permission to fish until the trout have had time to multiply.

Repairs of damage by a heavy fall of snow cost £12 12s. The creek walls were repaired at a cost of £26 5s. A mirror was placed in the "Queen's Diamonds," and proves a success.

Extra seats have been erected on the slopes surrounding the Caves House.

The Public Works Department has been requested to form a new road to the stables (M 01/23,847).

For the accommodation of school children, two rooms were shifted from "Braside," and re-erected in a suitable position (M 01/972).

Part of the kiosk was leased to Mr. H. Smith from the 1st April, at a rental of £5 per annum (M 01/6312).

New fencing has been erected round the plantations to keep out wallabies.

The poultry yard used by the caves house lessee has been shifted to a more suitable position.

An important improvement has been made to the Lucas Cave by opening up a new passage at a cost of £171 1s. Cd.

In this cave the new chamber named "The Mafeking" is now being made ready for inspection.

The guides continue to occupy their spare time in constructing tracks, &c.

WELLINGTON CAVES.

An acting caretaker was appointed for three weeks, during the absence on leave of the caretaker, at 25s. per week.

The caves have been made easy of access by the construction of steps, &c., at a cost of £38 9s. 2d.

Rose trees were forwarded to the caretaker, but owing to the drought have mostly perished.

WOMBAYAN CAVES.

An acting caretaker was employed for nine days.

A commodious building has been erected for the accommodation of visitors, from designs by the Government Architect.

Considerable improvements have been made in the caves at a cost of £21 15s. for material, and £82 5s. for labour.

The horse-paddock fence was extended at a cost of £11 17s. 2d.

On the 21st January an extraordinary fall of rain took place in the vicinity of the caves, doing an immense amount of damage. The damage has been repaired as far as practicable.

A new footbridge has been erected across the Wombeyan Creek.

Blacksmithy material has been supplied.

Roses have been planted round the Caves House.

A new branch of the Wollondilly Cave was discovered by the caretaker on the 18th January. I append a report.

I completed a survey of the Basin Cave, named from its remarkable basin-like deposits. Plan herewith.

YARRANGOBILLY CAVES.

As usual an assistant guide was employed for four months and two weeks during the busy season.

A new and handsome building, containing sixteen bedrooms, has been completed from designs by the Government Architect for the accommodation of visitors.

Water was supplied to the house from a reservoir at a cost of £109 5s 10d.

Two workmen are at present employed in improving steps, wire netting, &c., in the various caves—a very much needed work (M 01/21,614).

The bath at the Thermal Spring has been greatly improved (M 01/6,826).

An iron ladder has been placed in the Glory Hole Cave.

The caretaker has been authorised to ringbark a limited area within the horse paddock (M 01/21,891).

He has completed the sheep-paddock fence, repaired the horse-paddock fence, erected a stone wall at the back of the garden, and wire-netted part of the garden fence to keep out hares, which are somewhat numerous.

He reports the discovery of two very fine chambers—one in the Jersey Cave, and the other in the Castle Cave (M 01/6,825).

The guides and caretakers continue to carry out their duties in a satisfactory manner.

VISITORS.

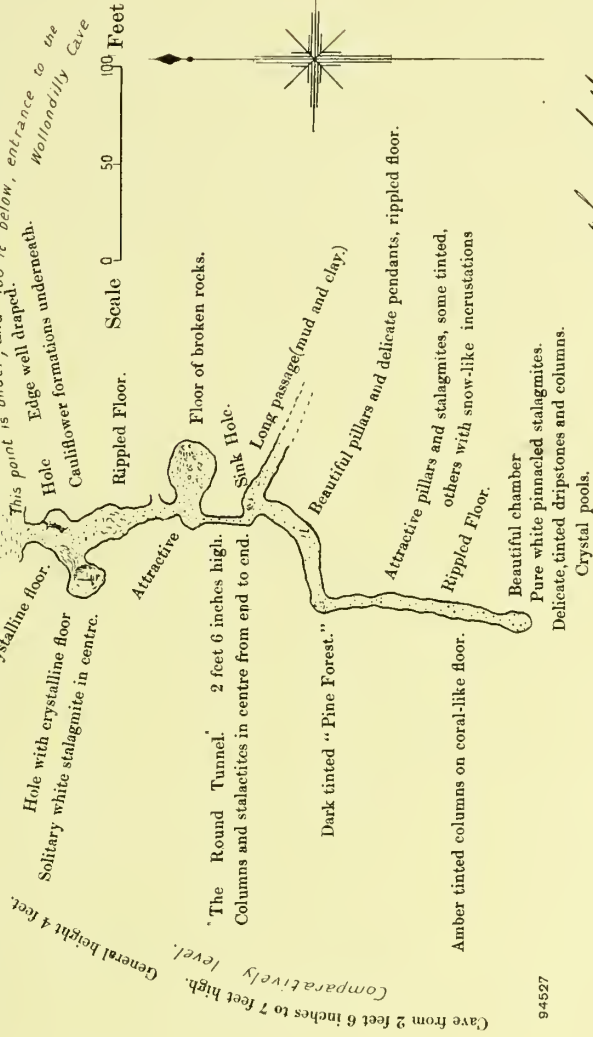
WOMBEYAN CAVES

THE BASIN CAVE.



MARES FO

PLAN OF Newly Explored Branch of the Wollondilly Cave



W. J. Rickell
h.s.

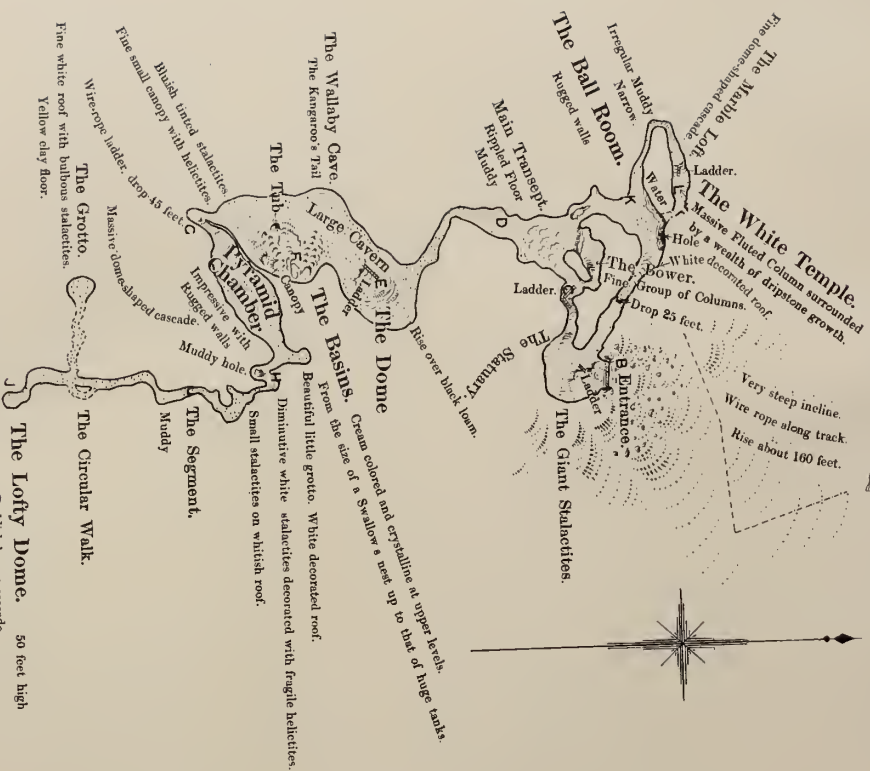
Photo-lithographed by
W. A. Gullick, Government Printer,
Sydney, N.S.W.

WOMBEGAN CAVES THE BASIN CAVE.

Scale 0 100 200 Feet

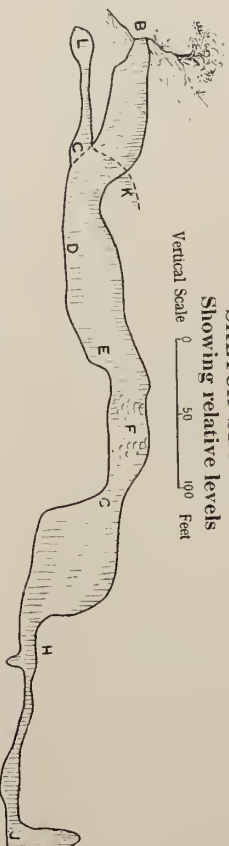
PLAN

MARES FOREST CREEK.

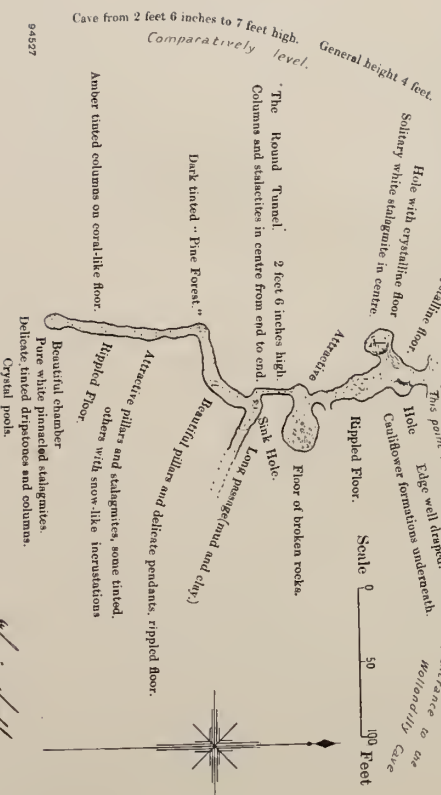


SKETCH SECTION Showing relative levels

Vertical Scale 0 50 100 Feet



PLAN OF Newly Explored Branch of the Wollondilly Cave



W. A. Gilbey
N.S.W.

VISITORS.

A noticeable increase has taken place in the number of visitors to the Jenolan Caves. It is pleasing to note this practical appreciation of the efforts which are made for the comfort of visitors.

Number of Visitors for Year 1901.

Abercrombie Caves	872
Bendithera Caves	9
Bungonia Caves	608
Jenolan Caves	3,566 (who paid 10,197 visits).
Wellington Caves	1,533
Wombeyan Caves	293 (who paid 520 visits).
Yarrangobilly Caves	586 (who paid 1,331 visits).
Total	7,467

Magnesium Ribbon Used.

Ribbon issued to caretakers, 755 oz. ; cost £47 17s. Ribbon used by guides, 760 $\frac{3}{4}$ oz. Amount collected for use of Ribbon, £348 6s. 10d.

Two new lamps have been constructed on an improved pattern at a cost of £7 each.

One of these lamps has been forwarded to Jenolan.

NEW PASSAGE—WOMBHEYAN CAVES.

I have inspected and measured a branch of the Wollondilly Cavern, Wombeyan Caves, explored by the caretaker on the 18th ultimo.

From end to end the new branch is narrow, low, and comparatively level. Its average height is about 4 feet, but it is only 2 ft. 6 in. high in places. Its length is a little over 300 feet.

It contains a most interesting series of dripstone growths. At 100 feet from the entrance is a small arched passage with stalactites and pillars running along its centre. The passage is singularly like the "Round Tunnel" in the left Jubilee Cave at Jenolan. Further on rippled floors with coralline and fir tree like growths, beautiful pillars, stalactites, &c., while the Terminal Chamber contains groups of attractive formations and dainty basins filled with crystals.

This branch is an important addition to the known caverns at Wombeyan, and will be worth opening up after other and previously-explored chambers have been made available for inspection.

I have indicated the position of the new branch on a plan herewith.

It is a great pleasure to me to be able to report that the members of the staff have uniformly shown great enthusiasm in their work. It is very gratifying to be associated with officers who take such a pride in performing their duties thoroughly, and without waste of time.

I have, &c.,

EDWARD F. PITTMAN,
Government Geologist.

APPENDIX.

INSTITUTIONS, &c., for which collections of geological specimens have been prepared.

Ashfield, Collegiate High School.

Brain, A. L.

Glen Innes, Grammar School.

Grafton, School (Miss Roser).

Martino, Edouardo.

* Smith, G.

Sydney: Marist Brothers High School.

St. Benedict's Boys' School.

Under Secretary for Mines and Agriculture.

The collection marked * was an exchange.

APPENDIX.

DONATIONS to the Mining and Geological Museum.

Donor.	Donation.
Abernethy, W.	Siliceous pseudomorph.
All, J.	Copper ore.
Bartlett, J. B.	Silver ores from Burrangorang.
Bartlett, W.	Pyrargyrite on quartz.
Bensusan, E. V.	{ Gold ores from Celebes and Sumatra.
	{ Specimens of timber used for mine work, Celebes.
Blakemore, W.	Stannite.
Brown, Selwyn.	Garnet (andradite).
Carne, J. E.	Rocks from New Hebrides.
Chadwick, F.	Pyritous blue quartz, effect of alteration of sandstone by a basalt dyke.
Davies, E. H.	Common opal with precious opal.
Davis, R. T.	Monazite gravel with crystal of same.
Deane, H.	Lignite from Botany.
Dunnicliff, A. B.	Axinite with epidote.
Fairfax and Roberts	Chiastolite crystals and polished slices of same.
Gainford, T.	Delessite.
Hamilton, J.	Lode tin ore.
Lamb, S.	Tin-bearing ironstone gossan.
Lett, C.	Rhodonite.
Lucas and Party	Cyanite.
Lush, C. G.	Lode tin ore.
Local Committee of Adelong Federal Capital Site.	Granite block.
Mackenzie, G.	Gold ore from Colorado, U.S.A.
Meredith, H.	Gold ore.
Mitchell, J.	Porphyry and chalybite.
Munro, D.	Amygdals of chalcedony in basalt.
McGlew, C. S.	Black oxide of manganese, artificial oxide of arsenic, hornblende.
McLachlan and Coghlan.	Diabase.

Gold—continued.

	Gold—continued.	Gold per ton.
3350. Crooked Creek, Cullenbone—Ferruginous cavernous quartz	0 oz.	19½ dwt.
3351. "		

Gold—continued.

	Gold per ton.
3189. Yellow Mountain—Quartz with ironstone	7 $\frac{2}{3}$ dwt.
3190. " " Pyritous silicified breccia	6 $\frac{1}{2}$ "
215. " " Copper-stained weathered schist	3 $\frac{1}{2}$ "
214. " " Carbonate of copper ore—weathered schist	6 $\frac{1}{2}$ "
289. From between Nerrigundah and Moruya—Broken-up quartz	1 oz.
1055. " " Spring and Dwyer's Creeks—Arsenical pyrites with quartz	2 " 14 $\frac{1}{2}$ "
3534. " " Wangat and Dungog—Ferruginous quartz.....	25 " 14 "

Silver.

	Silver per ton.
908. Bald Hill, Macksville—Broken up siliceous galena ore with arsenical and iron pyrites	32 oz.
1802. " " Crystallised galena and arsenical pyrites with quartz	67 "
2480. " " A very small piece of picked galena with copper pyrites and a little quartz.....	34 "
1350. " " Broken up galena with quartz and pyrites	62 "
981. " " Broken up galena with arsenical pyrites.....	44 "
1568. Basket Swamp, Boonoo Boonoo—Pyritous blue quartz; also a piece of quartz with ruby silver ore	301 "
1569. Basket Swamp, Boonoo Boonoo—Pieces of pyritous blue quartz with galena	323 "
2992. Beechwood (4 miles from), Hastings River—Quartz with galena	29 "
2100. Bolivia—Galena with blende	50 "
431. Bora Creek, Inverell—Small pieces of quartz with galena, blende, and arsenical pyrites	26 "
2847. Buddigower—Quartz with pyrites	144 " Tin 4 $\frac{1}{2}$ per cent.
2846. " Quartz with arsenical pyrites	132 " Tin 1 $\frac{1}{2}$ per cent.
2847 to 2855. Buddigower—Ferruginous quartz, pyrites, &c.	From 1 $\frac{1}{2}$ oz. to 163 oz.
1889. Bundarra (15 miles from)—A narrow vein of arsenical and iron pyrites with molybdenite ..	52 oz.
822. Burrarorang, Feldworth Mine—Gossanous material	1,478 "
587. " " Friable ferruginous quartz	77 "
605. " " Slightly copper-stained quartz with ironstone	524 "
754. " " Feldworth Mine—Lead gossan	254 "
693. Caloola (4 miles from)—Quartz.....	116 "
694. " " "	25 "
695. " " "	39 "
3230. Condobolin, Mount Nobby Mine—A small piece of copper gossan	21 "
2729. Cronnandale (20 miles north-east of Armidale)—Crystallised glassy quartz	106 "
3160. Crookwell (1 mile from)—Quartz containing sulphide and carbonate of copper.....	68 "
3082. Glen Elgin, near Five-mile—Galena and blend with quartz	29 "
2038. Gundabooka, Bourke District—Garnet, with compounds of arsenic, lead, iron, &c.	34 " Copper, 9 per cent.
3915. Guy Fawkes (Silver Bell Mine)—Pyritous quartz rubble	54 "
1970. Mount Costigan (5 miles from Tuena)—Iron and copper-stained carbonate of lead ore	53 " Gold, 6 $\frac{1}{2}$ dwt.
3600. Mount Oxley (on the plain, 6 miles west of)—Gossanous material	12 "
3601. " " "	45 "
553. Mount Walla, 5 miles from Rye Park—Broken up sample, carrying blende, &c.....	46 "
1625. " " " Cubical galena, with pyrites	40 "
1495. " " " Broken up sample of silicious slate, with pyrites, galena, &c.	16 "
25. Nangar, parish of Nangar, county of Ashburnham—Copper pyrites, with blue-black sulphide of copper	20 " Copper, 40 per cent.
478. Nellie's Gully (between Pine Ridge and Inverell)—Quartz, galena, blende, and copper pyrites in a granitic rock.....	5 "
3083. Nine Mile, Deepwater—Copper pyrites, with chloritic material	92 " Copper, 20 per cent.
1642. Rivertree—Quartz, with sulphide of antimony (Berthierite)	10 " Antimony, 21 per cent.
1403. Rock Flat Creek, near Bushy Hill—Copper gossan	20 " Copper, 35-25 per cent.
89. Rockvale—Ferruginous carbonate of lead ore	57 "
3164. Rye Park (4 miles east of)—Massive cerussite, with a ferruginous crust..	71 "
1987. " (West Wallah Mine)—Blende pyrites and galena, with quartz	21 "
484. Tenterfield—Sulphide ore, consisting of bands of pyrites and blende, with galena and copper pyrites.....	17 "
485. " Sulphide ore, consisting of arsenical pyrites and galena, with iron and copper pyrites.....	21 "
114. White Cliffs—Ferruginous carbonate of lead.....	132 "
369. Yerranderie (40-acre block)—Broken-up quartz	123 "

	Copper.

	Copper.
496 to 502. Alma, 5 miles from Broken Hill—Copper gossan and cyanite	From 1 per cent. to 39 per cent.
828. Ashford—Green carbonate of copper	38 per cent.
2000. Attunga, 16 miles north of Tamworth—Copper gossan	22 "
3368. Baker's Swamp—Copper gossan, with copper pyrites.....	10 "
3328. Bumbaldry, 18 miles from Grenfell—Copper gossan, with copper pyrites	12 "
225. Burnt Yards—Deeply copper-stained jasperoid rock	16 "
657. Caloola Creek—Copper pyrites and blende in schist	15 "
3498. Cambenang, 14 miles from Lithgow—Copper gossan, with ironstone and quartz	5 "
2957. Canbelego (5 miles from)—Ironstone, with oxidised copper ores	32 "
3507. Cangi—Rock, with veins of cuprite and carbonate staining	17 "
2973. " Copper gossan	33 "
3370. " Copper gossan	27-35 "
3394. Condobolin, Mount Nobby Mine.—Copper gossan	31 "
2283. " " " —Copper gossan	19 "
2169. Crookwell—Copper glance and pyrites with quartz	29 " Silver, 86 oz.
2999. Cudal—Quartz with red oxide and carbonate of copper	8 "
436. Cundumbul District, Parish of Gordon—Principally copper glance.....	20 "
1185. Dandaloo, Caroline Mine—Copper gossan	27 "
3344. Ffield (8 miles E. of)—Copper and iron pyrites with quartz	16 "
3421. Gloucester District, Curriubark Run—Copper gossan with bornite and copper pyrites.....	21 "
475. Gundagai—Copper-stained weathered slate	6 "
2631. Hastings and Forbes Rivers, (between) Parish Jasper, County Macquarie—Massive copper pyrites with quartz and chlorite.....	11 "
2632. Hastings and Forbes Rivers (between) Parish Jasper, County Macquarie—Massive copper pyrites with quartz and chlorite	25 "
3499. Inglebar (left-hand branch of)—Ferruginous vein quartz with galena and blue carbonate of copper	6 "
1109. Isabella River—Copper-stained gossanous slate with copper pyrites	18 "

Boghead Mineral.

No.	Locality.	Hygroscopic Moisture.	Volatile Hydrocarbons.	Fixed Carbon.	Ash.	Sulphur in Coal.	Specific Gravity.	Remarks.
562	Glen Alice, Capertee Valley	35	68.15	16.55	14.95	0.603 p.c.	1.231	Ash, light grey in colour, granular.
563	" " " "	30	55.70	13.40	26.60	0.466 p.c.	1.213	Ash, grey in colour, granular.
564	" " " "	25	68.50	13.05	18.20	.425 p.c.	1.137	Ash, light grey in colour, granular.
1108	Little River, near Picton	47	60.60	16.58	22.35	0.693 p.c.	1.230	Ash, greyish, granular.
1116	Rylstone	12	73.48	11.28	15.15	0.535 p.c.	1.106	Ash, greyish, granular.

*Miscellaneous Analysis.***3234.—Limestone, with casts of fossils, from near Booral, Port Stephens District.**

	Per cent.
Insoluble in acids (silica, &c.)	11.15
Ferric oxide and alumina (Fe_2O_3 and Al_2O_3)	1.10
Calcium carbonate (CaCO_3)	86.96
Magnesium carbonate (MgCO_3)	.79
	100.00

866.—Limestone from east of Braidwood.

	Per cent.
Calcium carbonate (CaCO_3)	89.85
Gangue	6.50
Ferric oxide and alumina (Fe_2O_3 and Al_2O_3)	1.50
Magnesium carbonate and undetermined matter	2.15
	100.00

2080.—Limestone from Gundagai.

	Per cent.
Calcium carbonate (CaCO_3)	96.82
Ferric oxide and alumina (Fe_2O_3 and Al_2O_3)	.64
Gangue	1.64
Magnesium carbonate and undetermined matter	.90
	100.00

746.—Limestone from Portion 1, Parish Clandulla.

	Per cent.
Calcium carbonate (CaCO_3)	91.96
Magnesium carbonate (MgCO_3)	7.09
Ferric oxide and alumina (Fe_2O_3 and Al_2O_3)	.46
Gangue	.76
	100.27

3530.—Limestone from Portion 40, Parish Nattai, County Camden.

	Per cent.
Calcium carbonate (CaCO_3)	95.80
Ferric oxide and alumina (Fe_2O_3 and Al_2O_3)	.80
Insoluble in acids (gangue)	3.05
Magnesium carbonate and undetermined matter	.35
	100.00

1491.—Limestone from Tongarra, near Albion Park.

	Per cent.
Silica (SiO_2)	14.75
Ferric oxide (Fe_2O_3)	1.70
Alumina (Al_2O_3)	5.15
Calcium carbonate (CaCO_3)	74.73
Magnesium carbonate and undetermined matter	3.67
	100.00

1264.—Crystalline Limestone from Wallabadah.

	Per cent.
Calcium carbonate (CaCO_3)	96.46
Insoluble in acids (silica, &c.)	1.42
Ferric oxide and alumina (Fe_2O_3 and Al_2O_3)	.92
Magnesium carbonate and undetermined matter	1.20
	100.00

3504.—Lignite from No. 4 trench, Church of England Cemetery, Botany.

	Per cent.
Hygroscopic moisture	13.65
Volatile hydrocarbons	29.15
Fixed carbon	55.00
Ash	2.20

Ash: Yellowish tinge flocculent.
No coke formed.

1635.—Brown Coal 25 miles from Narrabri.

	Per cent.
Hygroscopic moisture	2.92
Volatile hydrocarbons	35.25
Fixed carbon	23.61
Ash	38.22
	100.00

2069.—Travertine from Crown Swamp, Capertee.

	Per cent.
Moisture at 100° C.	.60
Lime (CaO)	52.74
Magnesia (MgO)	.69
Ferric oxide and alumina (Fe_2O_3 and Al_2O_3)	.20
Insoluble in acids	1.48
Carbon dioxide (CO_2)	41.68
Sulphur trioxide (SO_3)	.17
Phosphoric acid (P_2O_5)	.05
Organic matter	2.68
	99.69

The insoluble in acids consists of sand, with a little clay. A small quantity of the lime is combined with organic matter.

3109.—Clay from about 8 miles from Marulan. Suitable for the manufacture of a fair class of fire bricks.**3235.—Granular magnetic iron ore from Booral, Port Stephen's District.**

	Per cent.
Metallic iron	51.49
Silica	8.77
Titanic acid	11.55

2940.—Weathered shale containing soluble sulphates from Nanima.

Soluble in water (5.23%) dried at 100° C.

	Per cent.
Aluminic sulphate	2.73
Sodic sulphate	.69
Potassic sulphate	trace
Magnesian sulphate	.90
Sodic chloride	.09
Organic matter, &c.	.82
	5.23

2941.—Weathered shale containing soluble sulphates from Nanima.

	Per cent.
Soluble in water 1.02% dried at 100° C.	
Sodic chloride	.33
Magnesian sulphate	.36
Sodic sulphate	.13
Trace of potash (K_2O), alumina (Al_2O_3), and water over 100° C.	.20
	1.02

1882.—Material from range 9 miles north-west of White Cliffs Opal Field.

	Per cent.
Moisture at 100° C.	5.40
Combined water	5.91
Silica (SiO_2)	68.12
Alumina (Al_2O_3)	15.25
Ferric oxide (Fe_2O_3)	.76
Ferrous oxide (FeO)	.27
Manganous oxide (MnO)	minute trace
Copper oxide (CuO)	absent
Lime (CaO)	.42
Strontia (SrO)	trace
Magnesia (MgO)	.77
Potash (K_2O)	.73
Soda (Na_2O)	.77
Phosphoric acid (P_2O_5)	.01
Vanadium Pentoxide (V_2O_5)	.03
Titanic acid (TiO_2)	.74
Chromium sesquioxide (Cr_2O_3)	minute trace
Sulphur trioxide (SO_3)	.19
Chlorine (Cl)	1.29
	100.66

Less oxygen equivalent for chlorine

100.38

1879.—Fire clay from Bunker Creek, near White Cliffs Opal Field.

	Per cent.
Moisture at 100° C.....	3·98
Combined water.....	7·30
Silica (SiO ₂).....	63·55
Alumina (Al ₂ O ₃).....	21·89
Ferrie Oxide (Fe ₂ O ₃).....	·57
Ferrous oxide (FeO).....	·21
Manganous oxide (MnO).....	minute trace
Copper oxide (CuO).....	minute trace
Lime (CaO).....	·32
Strontia (SrO).....	—
Magnesia (MgO).....	·57
Potash (K ₂ O).....	·64
Soda (Na ₂ O).....	·71
Phosphoric acid (P ₂ O ₅).....	minute trace
Vanadium Pentoxide (V ₂ O ₅).....	·03
Titanic acid (TiO ₂).....	·24
Sulphur trioxide (SO ₃).....	·04
Chlorine (Cl).....	·64
	100·69
Less Oxygen equivalent for chlorine.....	·14
	100·55

1881.—Material occurring just below seam of opalised bivalve shells, White Cliffs Opal Field.

	Per cent.
Moisture at 100° C.....	3·83
Combined water.....	8·27
Silica (SiO ₂).....	61·60
Alumina (Al ₂ O ₃).....	23·32
Ferrie oxide (Fe ₂ O ₃).....	·80
Ferrous oxide (FeO).....	·18
Manganous oxide (MnO).....	minute trace
Lime (CaO).....	·48
Magnesia (MgO).....	·70
Potash (K ₂ O).....	·27
Soda (Na ₂ O).....	·24
Phosphoric acid (P ₂ O ₅).....	minute trace
Vanadium Pentoxide (V ₂ O ₅).....	·01
Titanic acid (TiO ₂).....	·72
Chromium sesquioxide (Cr ₂ O ₃).....	—
Sulphur trioxide (SO ₃).....	—
Chlorine (Cl).....	trace
	100·42

1566.—White siliceous rock from Bunker Creek, near White Cliffs Opal Field.

	Per cent.
Moisture at 100° C.....	1·90
Combined water.....	7·89
Silica (SiO ₂).....	66·14
Alumina (Al ₂ O ₃).....	21·45
Ferrie oxide (Fe ₂ O ₃).....	·78
Ferrous oxide (FeO).....	—
Manganous oxide (MnO).....	absent
Lime (CaO).....	·41
Magnesia (MgO).....	·45
Potash (K ₂ O).....	·68
Soda (Na ₂ O).....	·46
Phosphoric acid (P ₂ O ₅).....	minute trace
Sulphur trioxide (SO ₃).....	·11
Chlorine (Cl).....	·17
Organic matter.....	trace
	100·44
Oxygen equivalent of chlorine.....	·03
	100·41

1883.—White Cliffs Opal Field, just above the third opal seam.

	Per cent.
Moisture at 100° C.....	2·37
Combined water.....	9·33
Silica (SiO ₂).....	59·64
Alumina (Al ₂ O ₃).....	25·44
Ferrie oxide (Fe ₂ O ₃).....	·59
Ferrous oxide (FeO).....	·27
Manganous oxide (MnO).....	minute trace
Lime (CaO).....	·74
Magnesia (MgO).....	·47
Potash (K ₂ O).....	·35
Soda (Na ₂ O).....	·33
Phosphoric acid (P ₂ O ₅).....	·02
Vanadium pentoxide (V ₂ O ₅).....	trace
Titanic acid (TiO ₂).....	·57
Sulphur trioxide (SO ₃).....	·06
Chlorine (Cl).....	·02
	100·25

1880.—Gritty Rock, Bunker Creek, near White Cliffs Opal Field.

	Per cent.
Moisture at 100° C.....	4·81
Combined water.....	8·23
Silica (SiO ₂).....	62·83
Alumina (Al ₂ O ₃).....	20·00
Ferrie oxide (Fe ₂ O ₃).....	·27
Ferrous oxide (FeO).....	·28
Manganous oxide (MnO).....	minute trace
Lime (CaO).....	·35
Magnesia (MgO).....	·48
Potash (K ₂ O).....	·71
Soda (Na ₂ O).....	·43
Phosphoric acid (P ₂ O ₅).....	·01
Vanadium pentoxide (V ₂ O ₅).....	trace
Titanic acid (TiO ₂).....	·96
Sulphur trioxide (SO ₃).....	·22
Chlorine (Cl).....	1·17
	100·75
Less oxygen equivalent for chlorine ..	·25
	100·50

2157.—Stannite with galena, copper pyrites, quartz, &c., from Bora Creek.

A very small amount of selenium was detected in this sample, the amount present being considerably under 0·02 per cent. No satisfactory reaction was obtained for the presence of tellurium, although a large quantity of the material was taken for examination.

51.—Inferior plumbago, from Bookookoorara.

	Per cent.
Moisture and combined water.....	6·55
Carbon.....	44·84
Ash.....	48·61
	100·00
Ash: Buff-coloured.....	100·00

1590.—Barytes, from Bathurst.

	Per cent.
BaSO ₄ Barium sulphate.....	65·35

2160.—Montanite, from Nanima.

	Per cent.
Bismuth (Bi).....	57·73
Tellurium (Te).....	19·15
Selenium (Se).....	trace
Iron (Fe).....	·40
Copper (Cu).....	·24
Manganese (Mn).....	1·78
Magnesia (MgO).....	·08
Lime (CaO).....	trace
Insoluble matter.....	2·52
Carbon dioxide (CO ₂).....	1·05
Water.....	1·61
Oxygen (by difference).....	15·44

Specific gravity, 6·823. 100·00

The absence of gold, silver, sulphur, and sulphur trioxide proved. The finely-powdered mineral is partially soluble in HCl, evolving chlorine, the manganese present being as MnO₂. A few small specks of steel-grey foliated tetradymite were present in the various pieces of mineral. The main bulk of the mineral is evidently an alteration product of the tetradymite.

2488.—Water, from Kangaroo Valley.

	Grains per gallon.	In 1,000 parts.
Sodium chloride (NaCl).....	162·069	2·3152
Potassium chloride (KCl) ..	trace	trace
Magnesium chloride (MgCl ₂) ..	57·415	·8202
Calcium chloride (CaCl ₂) ..	47·075	·6725
Magnesium sulphate (MgSO ₄) ..	15·616	·2231
Calcium carbonate (CaCO ₃) ..	26·090	·3727
Strontium carbonate (SrCO ₃) ..	trace	trace
Silica (SiO ₂).....	1·008	·0144
	309·273	4·4181

1277.—Water, from Quambone Station.

Chemical composition of total solid matter—

	Grains per gallon.	In 1,000 parts.
Silica and silicates.....	1·260	0·0180
Sodium carbonate (Na ₂ CO ₃) ..	40·145	·5735
Potassium carbonate (K ₂ CO ₃) ..	trace	trace
Sodium chloride (NaCl).....	7·099	·1014
Calcium carbonate (CaCO ₃) ..	·599	·0085
Magnesium carbonate (MgCO ₃) ..	·317	·0045
Oxide of iron and alumina ..	traces	traces
	49·420	0·7059

Free ammonia :—Nil per 100,000 parts.

Alluminoid ammonia :—0·002 per 100,000 parts.

ANNUAL REPORT OF THE NEW SOUTH WALES MINERS' ACCIDENT
RELIEF BOARD.

Board Room, Department of Mines and Agriculture,

Sir,

Sydney, 11 March, 1902.

I have the honour to submit herewith a Statement of the Accounts of the New South Wales Miners' Accident Relief Fund for the year ended 31st December, 1901.

The books and accounts for the year have been examined by the Auditor-General as prescribed by the Act, and the Statement bears the necessary endorsement.

The Board's Accounts closing on 31st December, the statement does not include all the operations at the several mines up to that date. In making their returns, committees are conditioned by the varying methods of paying wages which are in vogue at the different mines, and some measure of delay is therefore unavoidable.

On the whole the Act was well received, and although in a few cases it was accepted in a spirit of protest, on the other hand desires to share the advantages which the Fund offers have been expressed by employees of mines not subject to the provisions of the Act by reason of the limited number of employees.

The committees at the several mines have devoted themselves to the work of local administration with considerable energy and ability. A most pleasing feature of their work has been the strongly evidenced desire to safeguard the Fund from imposition. When dealing with applications for relief, committees have made careful inquiries, in some cases inquiries of an exhaustive character, and where any room for suspicion has existed the full facts have been reported to the Board with requests for advice.

Although owners and managers have in a few cases declined to be represented on the committees, in the majority of instances their valuable co-operation has contributed to the satisfactory results obtained at local centres. Where managers or members of their clerical staff have participated in the work of committees, their knowledge of business methods and forms has been of considerable service.

During the year the Act was in operation at 168 mines. Of these, 114 were subject to its provisions for the whole term, and the balance for more or less broken periods. At the close of the year, 128 mines were contributing, the total number of persons employed at such mines being approximately 17,300.

A considerable proportion of the smaller mines vary so materially from month to month in the number of persons employed that in many instances the number of employees may rise or fall above or below the statutory number, fifteen, with considerable frequency. The long continued drought and the decline in the price of certain metals have contributed largely to the partial or complete stoppage of work at several of the mines at one time subject to the Act.

From the Statement of Accounts it will be noticed that the contributions from employees at the several mines reached a total of £19,118 2s. 8d, a sum approximately equal to one year's contributions from 20,000 persons.

The following statements may be of interest as showing the beneficent operations of the Fund :--

Number of distinct mines subject to the Act during the year ...	...	...	168
Number of mines subject to the Act, 31st December, 1901 ...	...	...	128

FATAL ACCIDENTS.

Number of fatal accidents	...	...	...	...	...	47
Widows, receiving benefits from the Fund	...	...	...	...	...	26
Mothers	..	..	...	...	...	6
Aged sister	..	..	...	...	...	1
Children, in respect of whom benefits are payable	...	...	...	...	...	80
Average age of children—7 years.						

NON-FATAL ACCIDENTS.

Number of non-fatal accidents for which allowances were paid...	2,558
Periods of disablement :—	
Extending beyond 8 weeks	210
„ from 4 to 8 weeks...	409
„ „ 2 to 4 „ ...	859
Under 2 weeks	1,080

In 18 cases disablement extended beyond six months, varying from 26 to 49 weeks in duration. Several of the persons included in these more extended cases are still participating in the benefits provided, the majority of whom will probably be permanent beneficiaries.

						£	s.	d.
Funeral allowances paid	...	...	...	...	...	564	0	0
Relief paid, exclusive of funeral allowances:—								
(a) To relatives of deceased persons...	...	...	...	...	...	487	12	9
(b) To persons disabled	5,426	19	8
Total	£6,478	12	5

Average amount paid in cases of disablement (per case)...	£2	2	6
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In order to meet the allowances payable, 47 committees found it necessary to make one or more applications to the Board for assistance as provided by the Act. In the case of one mine the Board made fortnightly remittances to the committee for a period of 8 months.

Where mines which were for a time subject to the Act have ceased operations, or so reduced hands as to become non-contributors, and at which there have been beneficiaries entitled to continued relief by reason of accident, the allowances payable have in every case been regularly remitted by the Board to the persons so entitled.

Abundant proof has been given that the relief granted under the Act has, in many instances, been of material service and benefit. The beneficent operations of the Fund have minimised, in a large measure, the necessity for frequent appeals to public charity. To those who know the persistency with which in mining centres such appeals have previously been made, not the least appreciated effect of the Fund will be the diminution of that laudable but yet unsatisfactory practice.

The Fund is in a very healthy condition, and gives promise of considerable strength. As shown in the Statement of Accounts, the Board has placed in all £20,000 at interest, and a further sum of £5,000 was practically ready for investment at the end of the year. The rate of interest upon the money so invested is $3\frac{1}{2}$ per centum per annum.

It must, however, be remembered that the year 1901 was not marked by any very extensive calamity in any of the mines of the State. The largest individual occurrences were at Broken Hill South Silver-mine, and at Burwood Colliery. In the former instance six men were killed, and in the latter three lost their lives, and three were injured. The capacity of the Fund must be estimated in view of the possibility of disasters such as too frequently visit mining centres. One such disaster might impose upon the Fund a heavy immediate charge, and leave many permanent or long-continued obligations to be met therefrom. It is as yet too early to suggest or anticipate any liberalising of the Fund. More lengthy experience and observation are necessary to correctly estimate its possibilities.

The most carefully constructed Act, when brought to the test of practical working, will almost invariably be found capable of some measure of improvement. It was so with the Act under which the Fund was constituted, and an Amending Act was passed by the Legislature, and came into operation at the end of the year.

Some difference of opinion obtained as to the interpretation of the word "mine" as contained in the Principal Act. In terms of the Amendment Act the word "mine" includes "any works in the neighbourhood of the mine, where ore, coal, or shale from the mine is treated by owners of the mine."

In some of the mining districts of the State numbers of small mines exist, of which comparatively few, if any, employ a sufficient number of hands to subject them to the provisions of the Act. When men who had been employed at mines contributing to the Fund became employees of smaller mines not subject to the Act, they in some instances complained at the loss of the advantages offered by a Fund to which they had contributed. Provision was therefore made for combination on the part of the employees of two or more mines (employing in the aggregate 15 or more persons) under one committee. Such combination is optional, not compulsory.

Instances occurred in which unmarried men who met with fatal accidents left aged or infirm fathers, who had been dependent upon their sons for support. It was deemed advisable that such cases should be provided for, and the Act was amended accordingly. In such cases the father will, for the future, be entitled to an allowance of 8s. per week.

In cases of permanent disablement a further provision has also been made, and the sum of 2s. 6d. per week will be payable in respect of each child of the person permanently disabled until the child attains the age of 14 years.

The provision of the Principal Act with regard to owners' contributions, particularly the method of determining the amounts payable, was found to work unsatisfactorily, and in order to ensure more equitable contributions upon an uniform basis, it is now provided that owners shall contribute sums equal to one-half of the sums contributed by their employees.

The work devolving upon the committees was found to absorb a measure of time, and to entail some local expenditure. The Amending Act accordingly provides for the payment to committees of an allowance at the rate of 5 per cent. upon the employees' contributions, the maximum allowance per year to be £25, and the minimum £2 10s.

During the year valuable aid has been rendered by officers in other branches of the service. Useful information has been secured through the Chief Inspector of Mines, the Chief Inspector of Collieries, and their respective officers, and subjects remitted to local inspectors for inquiry and report have received prompt and careful attention. The services of some of the Mining Wardens and Wardens' Clerks have also been given most readily, and, when so requested, investigations into cases appearing to demand inquiry have been made with most approved thoroughness. When occasion has necessitated it, the aid of police officers has also been sought and secured with satisfactory results.

I have the honor to be, Sir,

Your obedient servant,

JOHN L. FEGAN,

Chairman.

J. BLANKSBY,

Secretary to the Board.

The Honorable the Secretary for Mines and Agriculture.

NEW

Dr.

CR.

	£	s.	d.	£	s.	d.		£	s.	d.	£	s.	d.
To Receipts by committees—							By Allowances paid—						
From mines employees, per managers	19,118	2	8				By committees	6,434	16	5			
From Board	337	11	10				By Board	43	16	0			
				19,455	14	6					6,478	12	5
„ Owners' contributions				6,304	14	1	„ Advances to committees (to meet allowances)				338	3	9
„ Government subsidy				6,140	15	0	„ Board fees				12	12	0
„ Exchange on cheques				1	8	0	„ Administration expenses				8	10	1
„ Suspense account, amounts paid in excess by owners... ..				3	16	0	„ Cost of remitting moneys to the Board				65	6	2
							„ Committees' remuneration account				15	4	7½
							„ Amounts unremitted by committees	4	12	4			
							Less amounts remitted in excess	0	15	1½			
											3	17	2½
				£ 31,906	7	7	„ Balance to Cr. of Fund				24,984	1	4
											£ 31,906	7	7
To Balance to Cr. of Fund.....				24,984	1	4	By Investment Account—						
							Bank of N.S.W., fixed deposit	3,000	0	0			
							C. B. Co. of Sydney „	3,000	0	0			
							City Bank of Sydney „	2,000	0	0			
							N.S.W. Funded Stock	12,000	0	0			
											20,000	0	9
							„ Bank of N.S.W., current account	5,007	7	2			
							Less unrepresented cheques—						
							D 23,020.....	0	0	9			
							133.....	0	11	11			
							136.....	2	5	0			
							142.....	2	8	0			
							144.....	0	9	9			
							145.....	16	4	0			
							146.....	1	6	6			
											23	5	11
											4,984	1	3
							„ Cash in hand				0	0	1
				£ 24,984	1	4					£ 24,984	1	4

For the Miners' Accident Relief Board,

JOHN L. FEGAN, Chairman.

J. BLANKSBY, Secretary to the Board.

11/3/02.

I hereby certify that I have examined the books of the Board, together with the vouchers, fixed deposit slips, Government securities, and the Bank book, and find this to be a true statement.

J. M'KERN,

Department of Audit, 19th February, 1902.

Inspector of Accounts.

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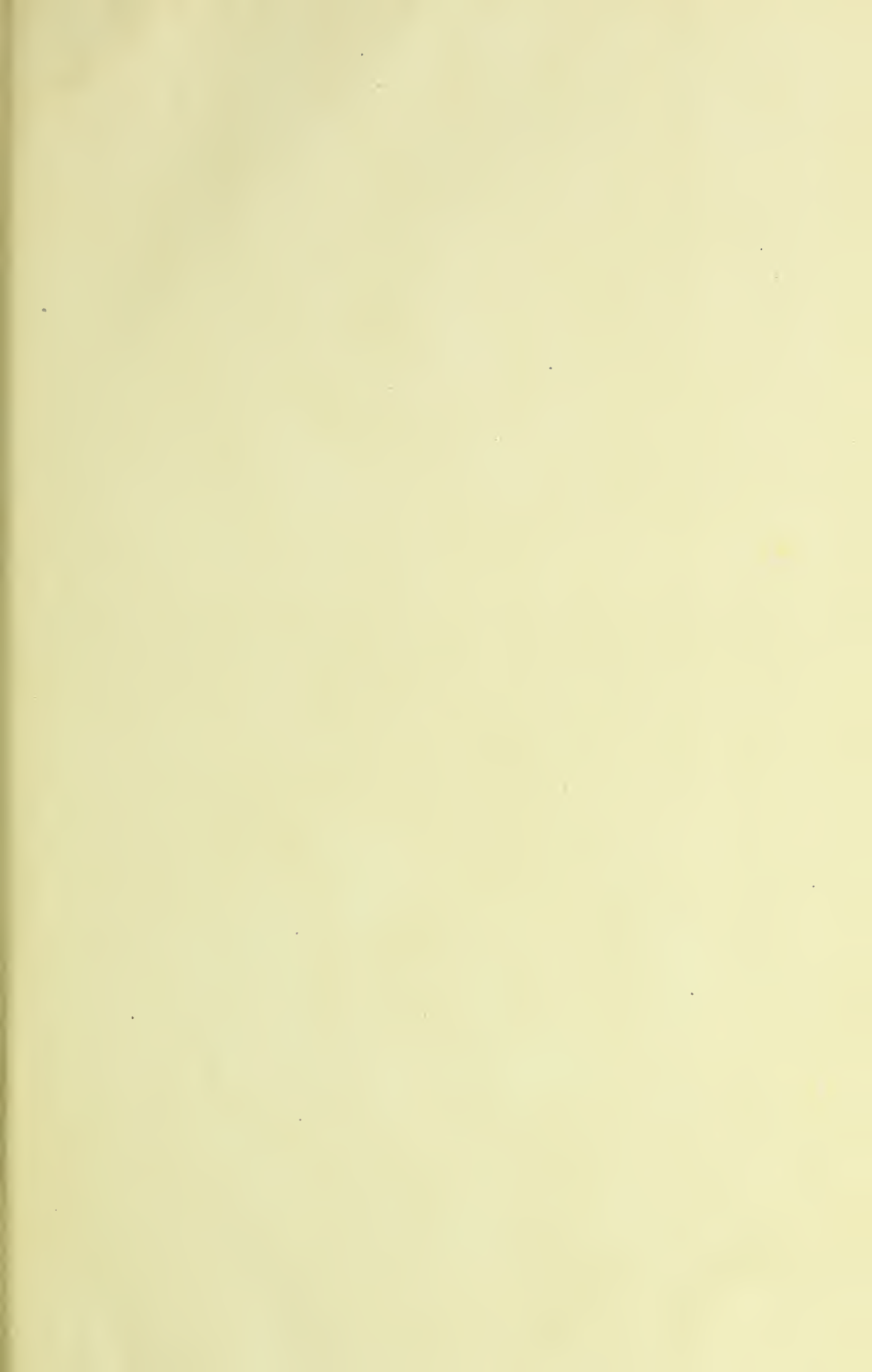
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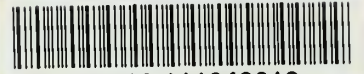
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[7 plans, 4 diagrams, 34 photos.]



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